

COMPUTER FLOORS
Anti-static carpet
Anti-static vinyl
Mats

MARVILLIN CARPET & TILES
Duke St. Bedford 214155

Computer Weekly

Thursday, March 5, 1981

From the system builders
The system builders complete
Argus700 Series2.
FERRANTI
Computer Systems

BBC will use Acorn Atom in micro series

by Paul Fisher
BBC executive producer John Radcliffe confirmed on Monday that Acorn Computers of Cambridge has been awarded the contract to supply the microcomputer for a television educational series.

The contract provides a double bonus to Acorn because the DoI has been waiting on the BBC's decision before completing the prize-giving for its recent National School Microcomputer Competition. The 536 schools which did not receive prizes will now be awarded Acorn microcomputers.

The ten-part series, provisionally called *Hands on Micros*, is due to be broadcast at the beginning of 1982.

The BBC microcomputer will be a modified version of the Acorn Atom, some 7,000 of which have been sold since last May. Its Basic will be close to the Microsoft version and will also include procedures. The BBC specified key-board improvements, so the new model uses field contact switches and has an extra 10 user-programmable keys.

It is being re-packaged in a larger box which is likely to be black and sell at just over £200.

A disc interface is built in, as are A/D inputs, high resolution graphics and an Econet capability. A standard option, to be priced at about £100, is a teletext receiver for the direct downloading of teletext.



Acorn's managing director Hermann Hauser (left) with sales director Chris Curry. Hauser is holding an Acorn Atom microcomputer which is similar to the model the BBC has ordered to support its forthcoming TV series.

Compeda lands \$2m software contract

by Keith Jones
AN important breakthrough into the US market has been made by Compeda in one of the largest single contracts for British software for an American customer.

Under the \$2 million agreement, Compeda, the National Research and Development Corporation subsidiary which markets computer-aided design software, will supply its Plant Design Management System to C. E. Lummus, one of the largest engineering construction companies in the world.

The package, described by Compeda managing director Keith Trickett as a "world beater", is for three-dimensional plant and pipe-work design.

Built to be transportable, PDMS will run on Prime minicomputers at C. E. Lummus locations in North America and Europe, and also on Control Data Cyber mainframes operated by the

C. E. Lummus parent company, Combustion Engineering, at its Windsor, Connecticut, computer centre. The Prime and CDC hosted systems will be interfaced.

Developed originally at the Computer-Aided Design Centre at Cambridge, PDMS is expected by Keith Trickett to provide about half Compeda's turnover in its 1981/82 year starting in April. With the Lummus contract under its belt, Compeda will record a turnover of around £2 million for 1980/81 and probably break even according to Trickett. In 1979/80 the firm made a £450,000 loss on a £1 million turnover.

Compeda, acquired the world-wide marketing rights to PDMS in 1977 and Keith Trickett says that no other pipework design package in the world can match it. It enables a designer to build a detailed three-dimensional model of the plant within the host computer.



'Back UK' plea

by Kevin Cahill
THE government must get behind the UK software industry, giving it better tax treatment, export assistance, and development funds.

This was the urgent plea made at a recent London BCS meeting by Philip Hughes, managing director of UK software house Logica.

Hughes said that the UK software, consultancy and software industry was one-third and one-tenth the size of its French and US equivalents respectively.

In the UK, over 50% of all business, software and consultancy services were produced by ten large companies. In the 45% public sector-supported US industry, the picture is fragmented, with many small local software companies leading to a high degree of specialisation.

The ten UK companies had a much larger range of specialisations than the US companies, and were ready to go abroad.

Further statistics produced by Hughes showed that only 4% of sales in the UK software and services industry were of complete software packages.

Canadian firm in US coup

by Rory Johnston
CANADIAN videotape system Teldion has staged a major coup in winning preference over its British and French rivals for five separate US trial systems.

While some of these will provide business information, others will be bringing newspapers and magazines into homes by telephone line and television cable.

The Times Mirror company in Los Angeles will install 200 sets in private homes, half of them with interactive capability. Not only will news pages from the Los Angeles Times, Popular Science and Stirling magazines be accessible, but home banking and shopping will be provided.

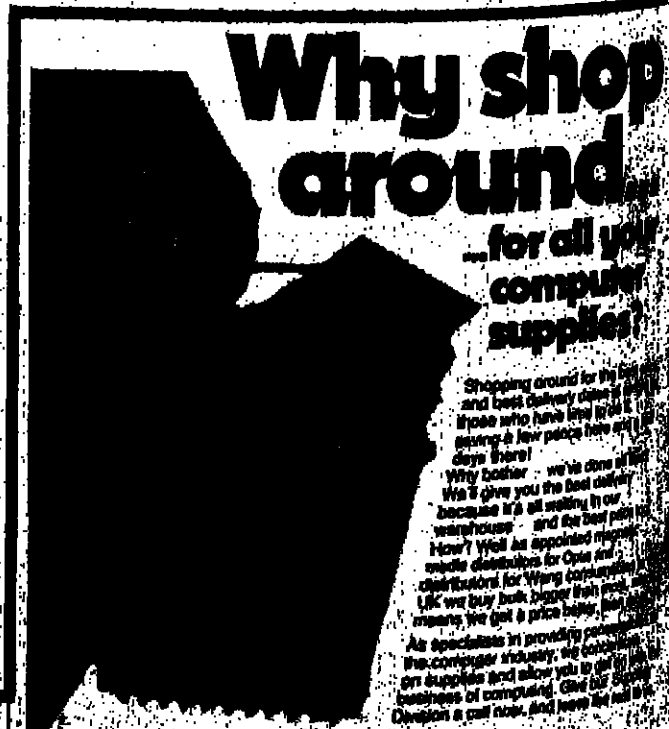
Cable television already has one channel devoted entirely to advertising. This will be extended, allowing users to key in choices and quantities of goods and their account numbers.

Goods will then be delivered by mail or parcels service, but which banks will be involved is a question yet to be decided.

Another trial will be run by the publishers of Time magazine, who already operate a cable TV service. Surprisingly, this will work as a teletext service, inserting pages of magazines on the blanking lines between television frames.

Teldion has more lines than the UK's Comsat system and will have rather more capacity, about 20 magazines of 120 pages each.

Other trials using Teldion are to be run by General Telephone and Electronics, for a business information service; Cox Cable TV in San Diego and TV station WETA in Washington DC.



Why shop around...
...for all your computer supplies!

Shopping around for the best prices and best service is what you need to get the most out of your computer system. We have a wide range of computer hardware and software to suit your needs. We also offer a free home visit to discuss your requirements and to demonstrate our products.

MLB.F.
Microcomputers & Peripherals
100, The Arcade, London EC2A 4PU

RAIR Terminal CHOICE

CENTRONICS 737

Desk-top miniprinter with text quality printing, proportional spacing, 1-way paper handling.

£425

RAIR 30-32 Neal Street, London WC2 Tel 01-836 4663

COMPUTER FINANCING INTERNATIONAL LIMITED

Standard House 2-5 Old Broad Street London WC1X 1BB

Telephone 01-417 1111 Telex 419 9955 Comp Fin

AVAILABLE April May

DATA PREPARATION
We have the capacity to punch your peak loads, file set-ups or regular work on 80 column cards.
Peter Merrick ASSOCIATES
Phone 01-888 6047 Croydon

VAT and DHSS payments dry up

DP staff stop State computers

by Nicholas Baticknap

GOVERNMENT computer systems used for record-keeping, revenue collection and defence administration were being brought to a standstill by the Civil Service unions this week. The action, announced on Sunday and put into effect on Tuesday after the one-day national strike on Monday, was a package of measures designed to exert the maximum pressure on government.

The VAT installation at Southend is experiencing strike action for the second time, having been closed down for several weeks early in 1979 as a result of strike action by members of the Civil and Public Servants Association (CPSA) and the Society of Civil and Public Servants (SCPS), both of which are involved in the present dispute.

According to SCPS general secretary Gerry Gillman, the effect of the loss of revenue to the government last year was a substantial increase in the Public Sector Borrowing Requirement, leading to the big jump in the Minimum Lending Rate in the autumn of 1979. And at that time the VAT rate was only eight per cent, compared with 15 per cent now.

The action involves data preparation staff at the installation, and means that VAT records will not be updated. The government will therefore have no means of knowing who owed them what, nor of calculating returns of VAT.

● Turn to back page

NHS work-to-rule action escalates

A SETTLEMENT of industrial action by computer staff within the National Health Service looked doubtful earlier this week as the union involved, the National Association of Local Government Officers (NALGO), met the employers at conciliation meetings held by the government's Advisory, Conciliation and Arbitration Service (ACAS).

The union is in dispute over a long-standing claim for parity for computer staff at Regional Health Authority computer centres with their counterparts in the private sector. The union is claiming an extra £300-£1,000 per person to which wages outside the Health Service. The cost nationally is estimated by the union to be about £1.5 million.

Computer staff at regional computer centres are working to rule, but action has escalated at two of them, the North West Regional computer centre at Preston, Manchester and the South West Region at Bristol.

In Manchester a strike of computer staff now involves 55 of the estimated 105 people in the centre, and follows the removal by two senior managers of about £9 million of cheques processed through the computer which had accumulated as a backlog because of the work to rule.

In Bristol the work to rule has resulted in 30 staff being locked out on Mondays and Fridays because of a management assertion that they were working at only three fifths of normal levels anyway.

For national action to be called off, it had to be lifted by the union's strike operations committee which was due to meet yesterday (Wednesday). The meeting at ACAS was for conciliation only, not arbitration, which is binding on the parties involved.

NEWS BRIEF

Pactel wins PAYE deal

PROJECT control of the prestigious scheme to computerise the Inland Revenue's PAYE system, will be handled by London-based management consultant, PA Computers and Telecommunications. The contract is the first to be awarded since ICL won the share of the hardware and its software, suggested Julian Allison, Inland Revenue's director of computer systems.

Three PACTEL units are allocated to the project, and will coordinate all work on the project, including training on project control techniques.

'Pirates' take most of micro software trade

by Claire Gooding
LARGE-SCALE piracy and illicit copying are being blamed for an alarming drop in the market for software cassettes to 40% of last year.

One of the reasons for the drop, according to Commodore, might be the figure of 100,000 copies of software cassettes, suggested Julian Allison, Inland Revenue's director of computer systems.

Allison, who once ran Petsoft, the company now incorporated into ACT Microsoft, told the audience at the Gower conference on software protection: "If I was

starting now, I'm almost sure that if I based the decision on money alone I'd decide to be a pirate.

"The quickest way to make money is to change the title of a package and sell it by mail order, maybe, if feeling nervous, changing a few line numbers and removing serial numbers - oh, and if it's well-known and might be spotted as a copy, I'd be sure to describe it as a backup."

Allison pointed to two popular packages on the Commodore Pet, the WP Wordcraft WP system from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT Microsoft, as prime targets. Before fitting a protective hardware/software interface, the UK publishers of Wordcraft thought they might be losing sales to the tune of 25% owing to bootlegging.

As for Visicalc, Printout had carried out a survey among retailers - "no names, no pack drill" - and concluded that for every legitimate purchase there were about 2 1/2 bootlegged copies.

Allison pointed an accusing finger from Dataview, and Personal Software's Visicalc programming aid, marketed in the UK by ACT

Breaking new ground in private viewdata for the holiday industry

by Donald Kennett

SUCCESS with a private viewdata trial has led Olympic Holidays to set up a full service planning to serve 1,000 travel agents by September - the start of the 1982 summer bookings season.

Though modest by comparison with systems envisaged by larger rivals Thomas Cook and Thomson Holidays, Olympic has emerged as a pioneer in private viewdata in the holiday industry.

Trials of the system, called Sparta, started last October with just four travel agents. Olympic's data processing manager Geoff Stevin said that when the system was demonstrated at the Association of British Travel Agents' conference in Florence in December, Olympic was "inundated with requests to use the system."

On January 2 the capacity was increased to handle 25 agents and in the middle of February, after

software changes had been made to incorporate users' suggestions on how the system should respond, 75 agents were kitted out with Sony or Cherry alphanumeric key-boards.

Expansion to a capacity for 1,000 agents must wait for the installation of a second Digital Equipment PDP-11/70 to be devoted entirely to Sparta, while the first 1170 will continue to run general accounting systems, support development work and provide back up for Sparta.

The new machine has already been delivered, but in turn is waiting for the company to move to a bigger office in central London.

Interaction with Sparta differs from other current viewdata services, not only by requiring an alphanumeric keyboard instead of the numeric keypad supplied with all television-based viewdata terminals, but also by indulging in

the heresy of conducting question and answer exchanges line by line until the screen is full, treating the terminal like a normal VDU - rather than exchanging one full viewdata page at a time as recommended by the keep-it-simple brigade.

Stevin says the line-by-line approach makes error-handling easier: the system can immediately cancel the line of input and tell the user the nature of the mistake.

He is also particularly proud of the "help-frame" response, which he considers to be an essential feature of any online system with remote users.

Relevant help-frames are summoned during inputting by typing a question mark and when the problem is clarified the system takes the agent back to where he or she left off in the booking process. A training mode allows the process to be simulated.



Riding the crest of new technology: Basil Mantos (on camel) is chairman and managing director of Olympic Holidays and pushing the company hard into private viewdata.

Texas lifts the veil on its strategy for the Eighties

by Chris Yonett

TEXAS INSTRUMENTS' last week unveiled seven products as part of its strategy for the next five years with the promise of still more to come shortly. The products are:

Three additions to the DS990 minicomputer range; a video terminal; a low-cost terminal; and two cartridge disc systems.

The disc drives come as part of the DS990 additions but are also available separately. The CD1400/32 has 32 M-bytes of storage, 16 fixed and 16 removable. The CD1400/96 has 96 M-bytes of storage, 64 fixed and 16 removable.

Derek Walker, computer products marketing manager for TI's European digital systems division, said the new DS990/7, DS990/9 and DS990/29 minicomputer were compatible with the existing family and had 128 K-bytes of memory. They are all housed in a 60-inch equipment cabinet with space for future expansion.

All three provide intelligent error

correction and can handle programs written in Cobol, Fortran 66, Fortran 78, Basic, Pascal and RPGII.

The DS990/7 is based on the 990/10 processor and CD1400/32 disc drive which are mounted in a pedestal cabinet which also provides space for optional chassis expansion or diskette drives. It costs from £27,950.

The Model DS990/9 also uses the 990/10 processor with the M-byte CD1400/96 disc drive and is seen as particularly suitable for integrated office systems. It is supplied with a T1 911 video terminal and costs £35,980.

The top of range model, DS990/29 is aimed at finance, insurance, rental, distribution, processing and bureau applications, said Walker. It is based on the larger 990/12 processor with 256 K-bytes of cache memory and can handle up to 15 users, has 96 M-bytes of store on disc and two T1911 video terminals.

Copyright law plunged into confusion

by Claire Gooding

US LAW on software copyright protection was thrown into confusion last week when the Supreme Court ruled that the use of a computer program to improve an industrial process was patentable. The case concerned a rubber moulding process in which a real time computer system monitored the temperature.

The decision drastically alters the issue of software protection in the US, and is likely to re-open arguments in favour of this form of protection elsewhere. But, it did not pass without opposition.

Justice John Paul Stevens, who wrote a 27-page dissent on the ruling, objected that the compu-

terised process does not add anything new to the original industrial formula, but rather provides a more reliable technique of measuring the temperature inside the mould.

Other judges joined Justice Stevens in claiming that the majority decision had misunderstood the applicant's claimed invention. They predicted that the ruling would aggravate confusion among patent lawyers.

"The lawyers will not be able to tell which computer-related inventions were patentable and which were not," Justice Stevens predicted.

The rubber case had reached the Supreme Court after an appeal on

an adverse decision by the Court of Customs and Patent Appeals.

The case hung on the mathematical formula used to define the heat-control which was critical to the rubber moulding process. Justice William Rehnquist concluded for the majority opinion that the patent applied for was an attempt to protect a manufacturing process, and not a mathematical formula.

"This overruled former decisions in 1973 and 1978 that such formulae used in programming were laws of nature, and unpatentable. The US Patent and Trade Mark Office has long opposed the patenting of programs. It currently has 3,000

applications for patents involving computer/software techniques.

The decision was welcomed by companies which have invested in developing computerised techniques. It is hoped that this form of protection will accelerate and stimulate an already fast-growing technology.

"The value of a patent can spell the difference between life and death for small software companies," said one lawyer.

"There are adherents to the idea of patenting software in the UK, although it is not seen as a likely alternative to copyright."

Software piracy conference. Report pages 8/9.

Court order on Telecomputing's US supplier

by Keith Jones

TBECOMPUTING, which has won the latest round in its legal battle with ECS Microsystems, has been ordered by the US court to provide a 50% share in ECS Microsystems by buying the 900,000 shares held in the California firm by Michael Roberts.

Roberts founded ECS in Australia and ran it until last year when its main activities were transferred to California and US financial interests took control.

ECS activities in Australia now comprise an operation called ECS Australia which is a subsidiary of ECS Microsystems and which assembles and markets kit shipped in from California.

The US shareholders in ECS Microsystems now want to sell

financially troubled ECS Australia to Roberts whose main source of funds is the 900,000 shares, held through ECS Holdings.

But ECS Microsystems in California said that it wanted cash from Roberts rather than a share swap.

Meanwhile Telecomputing is pursuing its action filed against ECS Microsystems in California on February 20 before the UK High Court charges ECS with supplying faulty equipment and exploiting other European distributors.

Roberts whose main source of funds is the 900,000 shares, held through ECS Holdings.

But ECS Microsystems in California said that it wanted cash from Roberts rather than a share swap.

Meanwhile Telecomputing is pursuing its action filed against ECS Microsystems in California on February 20 before the UK High Court charges ECS with supplying faulty equipment and exploiting other European distributors.

Computer Weekly
Thursday, March 12, 1981
Vol 30 No 743

100,000 circulation
— the highest of any computer journal in Britain

IPC Electrical-Electronic Press Ltd, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, Tel: 892084 BISPHS

EDITORIAL		DISPLAY ADVERTISING		CLASSIFIED ADVERTISING		CIRCULATION	
Editor	Simon Timin	Advertisement Manager	Brian Durrant	Advertisement Manager	Brian Durrant	Terms of circulation control	Computer Weekly is sent free of charge to the following categories in the UK and Ireland only: Company directors, company secretaries, management executives, civil servants, consultants, lecturers and teachers, managers/supervisors, system analysts/O&M officers, programme operators, computer scientists and other engineers.
Deputy Editor	Parag Mehta	Deputy Advertisement Manager	Chris O'Keefe	Assistant Advertisement Manager	Chris O'Keefe	Prof for 1980 was £11,718,000, against £9,185,000 in 1979, an improvement of £2,533,000.	The company's exported 1980 contribution was £25,654,000, from which an interim dividend of £2,000,000 was paid.
Managing Editor	John Jones	Deputy Advertisement Manager	David Hogg	Ken Ward	Ken Ward	Turnover was 26% up from £32,425,000 to £103,618,000.	Because of the company's status as a wholly owned subsidiary of NCR Corp, the share figures have little impact in the UK, other than to highlight the profits which can still be made.
Deputy Managing Editor	John Jones	Deputy Advertisement Manager	John White	Ken Ward	Ken Ward	The company's exported 1980 contribution was £25,654,000, from which an interim dividend of £2,000,000 was paid.	In a footnote to the accounts the company shows how the application of current-cost accounting reduced the profit by a mere 2%.
Deputy Managing Editor	John Jones	Deputy Advertisement Manager	John White	Ken Ward	Ken Ward	The company's exported 1980 contribution was £25,654,000, from which an interim dividend of £2,000,000 was paid.	This is because technological change is pushing down the real cost of computing, so maintaining a price level just above inflation, after ancillary equipment costs are taken into account.
Deputy Managing Editor	John Jones	Deputy Advertisement Manager	John White	Ken Ward	Ken Ward	The company's exported 1980 contribution was £25,654,000, from which an interim dividend of £2,000,000 was paid.	Burroughs made foreign exchange transaction gains of £1,552,276, because of the appreciation of sterling.

Bid to beat US and become biggest maker of personal systems

Sinclair aims to clean up with a £70 microcomputer

by Brandon Gamester

WITH the launch last week of a new £70 microcomputer, the innovative Cambridge company, Sinclair Research plans shortly to overtake Radio Shack and Apple to become the world's leading manufacturer, in terms of unit sales, of personal computers.

Sinclair's first computer, the £99 ZX80 is currently said to be outstripping all other personal computers put together in the UK, and its successor the ZX81 will start to be manufactured at the same rate, 10,000 units a month.

It will be produced at Times' factory in Dundee, which is also producing the recently announced laser-screen TV. Manufacture of the ZX80 will probably cease in four to five months, says company managing director Clive Sinclair.

Despite the reduction in price, the ZX81 incorporates significant improvements over the ZX80. It has an 8K ROM Basic interpreter, the chip first announced last September (and subsequently with-

drawn) to upgrade the ZX80 which has only a 4K ROM. This enables the ZX81 (and converted ZX80) to work in floating point arithmetic to a 9-digit accuracy. It also makes possible log and trig functions and their inverses.

The ROM also extends and improves on the graphics facilities of the ZX80, and adds 37 additional functions to the keyboard (a new keyboard template has to be overlaid on a converted ZX80).

The 40-key touch sensitive keyboard on ZX81 now gives the equivalent of 91 keys, each key representing both alphanumeric characters and "single-press" Basic commands. In graphics mode an additional 20 graphical and 54 inverse video characters can be entered directly from the keyboard. The graphics display can also be divided into 64x44 blocks, each of which may be "blackened" in or "whited" out under program control.

Another new feature is the ability to operate in "fast" and "slow"

modes. Fast is said by Sinclair to be roughly equivalent to the speed of operation of other popular personal computers, whereas slow is quarter this speed and enables the ZX81 to compute and display simultaneously. This allows con-

tinuously moving animated displays without the flicker which dogged the ZX80.

One of the keys to the low price of the ZX81 (besides the dependence on high volume sales) is the use of a new custom-built chip, being manufactured in the UK by Ferranti, which replaces 18 chips in the old ZX80. This brings the total number of chips in the ZX81 down from 22 to four, as opposed to as many as 50 in many other personal computers. The microprocessor in the new computer is the Z80A as before.

Sinclair plans to continue to sell mainly through mail order. The computer, a 200-page instruction manual that includes a course in Basic programming, and a mains adaptor will cost £69.95. In kit form with the manual it will sell for £49.95. Also available is the £50 16K-byte RAM pack, which has been available for the ZX80 to supplement the internal 1K-byte RAM.

Besides the interfaces for a cas-

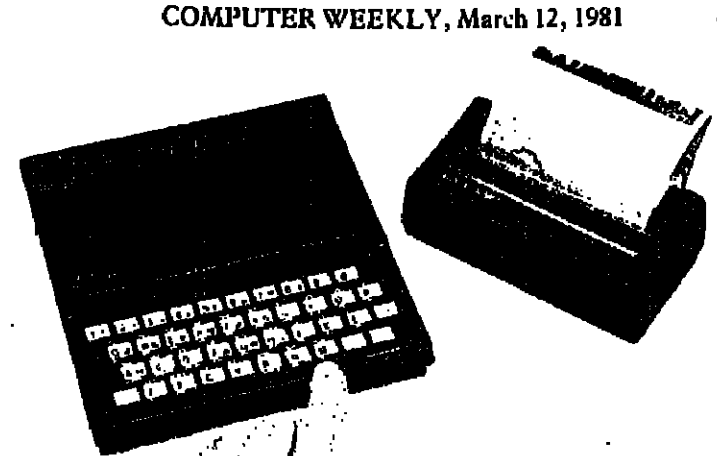
sette player and a conventional television set (to act as VDU), the ZX81 can be plugged into a printer.

Sinclair will start marketing its own 32-column printer in June, a highly compact £50 machine designed for use with the ZX81 and upgraded ZX80. A copy command on the keyboard will set the printer to reproduce exactly what is on the TV screen within 12 seconds.

A number of cassette programs are also being sold by Sinclair at £3.95 each: a "games" cassette which operates with the 1K RAM, and three others which require the additional 16K RAM.

Questioned on the reasons why his company did not win the contract for the supply of microcomputers for the forthcoming BBC educational microcomputer series, Sinclair commented, "Why the BBC has acted as it has is beyond us... we offered a machine that would do everything that the Acorn Atom can at a price of £110." The modified Acorn Atom which will be sold side by side with the series is expected to sell at just over £200.

Sinclair added that he was most deeply disturbed by the possibility of the BBC using some archaic form of Basic.



The six-inch square ZX81 incorporates a new custom chip which replaces 18 from the ZX80. On the right is the £50 printer which will be available in June.

AT&T is keen to settle in anti-trust case

by Donald Kennett

THE US Justice Department last week began presenting its evidence to the Federal Court in Washington for its long-awaited anti-trust case against US telephone giant, AT&T, alleging that AT&T has unfairly monopolised the telecommunications business.

The case has been postponed from January when both sides said they had come up with a framework for an out-of-court settlement.

It was resumed last week when the deadline passed without a "consent decree" being submitted to the court. Attorneys for the two parties are now expected to take up to a year each to present their evidence, unless settlement negotiations succeed in the meantime.

Talks were broken off last week when the Attorney General from the Carter Administration finally handed over to his successor in the Reagan Administration.

The new man was once an officer of AT&T, so he is refusing to be involved in the case. The Assistant Attorney General also wishes to avoid the accusation of bias because of some pensions work he did for AT&T. The third

possibility is the man who is expected to become head of the anti-trust division of the Justice Department, Stanford University law professor William Baxter, but his appointment has yet to be approved by the Senate.

Any settlement reached is thought likely to involve the splitting up of AT&T into separate operating companies, but the full extent to which this would be required is not known. AT&T says it is keen to negotiate a settlement, because the case will cause difficulties in running its business.

The company is already busy restructuring itself to conform by March next year with the recommendations of the Federal Communications Commission that AT&T should form separate subsidiaries for competitive activities. This includes the supply of terminal equipment and the provision of "enhanced" data communications services - in which the information is changed in some way during transmission. The decision has yet to be confirmed by the courts after challenges from competitors.

But the FCC's decision does not go far enough for the Justice Department.

NCR makes £11m in UK...

NCR GROUP Ltd, the UK arm of the NCR Corp, pushed up profit and turnover in 1980, despite tough trading conditions.

Profit for 1980 was £11,718,000, against £9,185,000 in 1979, an improvement of £2,533,000.

Turnover was 26% up from £32,425,000 to £103,618,000. The company's exported 1980 contribution was £25,654,000, from which an interim dividend of £2,000,000 was paid.

Because of the company's status as a wholly owned subsidiary of NCR Corp, the share figures have little impact in the UK, other than to highlight the profits which can still be made.

In a footnote to the accounts the company shows how the application of current-cost accounting reduced the profit by a mere 2%.

This is because technological change is pushing down the real cost of computing, so maintaining a price level just above inflation, after ancillary equipment costs are taken into account.

£3,000,000 was paid.

Because of the company's status as a wholly owned subsidiary of NCR Corp, the share figures have little impact in the UK, other than to highlight the profits which can still be made.

In a footnote to the accounts the company shows how the application of current-cost accounting reduced the profit by a mere 2%.

This is because technological change is pushing down the real cost of computing, so maintaining a price level just above inflation, after ancillary equipment costs are taken into account.

Burroughs made foreign exchange transaction gains of £1,552,276, because of the appreciation of sterling.

Burroughs made foreign exchange transaction gains of £1,552,276, because of the appreciation of sterling.

Intelligent network processors by Codex. It pays to concentrate.



Codex 6000 Series INP's present the most advanced means of managing data communications networks. The multi-processor architecture provides economy, performance advantages and high flexibility in solving the most intractable networking problems.

More intelligent than a multiplexer, more economical and efficient than a concentrator, a 6000 INP offers unique data handling functions - including:

- providing centralised network control and monitoring for all nodes
- gathering statistical measurements of network performance
- detecting and reporting abnormal conditions when preset thresholds are exceeded
- statistically combining information from up to 248 terminals as traffic is offered
- substituting short code words for frequently

used characters to increase throughput (data compression).

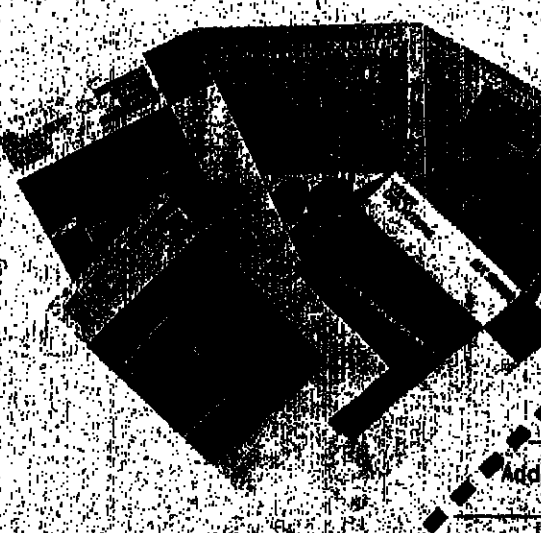
The 6000 INP combination of statistical multiplexing and data compression achieves substantial savings by decreasing modem and line costs.

Other features: operational transparency (no special equipment or software engineering), modular expandability, full-duplex GO-BACK-N ARQ internal protocol for error-free communications.

For full details, please use the coupon. Or the telephone.

codex
WE'LL GET YOU THROUGH

Codex (UK) Limited is a subsidiary of
MOTOROLA LTD.
To Codex (UK) Limited,
105 Lansdowne Road,
Croydon CR2 5BH.
Telephone 01-880 6507.
Full information about your
6000 Series INP's, please,
specify any other information
you may require.



Name _____
Position _____
Company _____
Address _____

Sheffield 117

Rory Johnston talks to the new Minister who has personal experience of his responsibility for computers

Information Technology seen as salvation of industrial Britain

IT is dangerous to crusade too vigorously for action. Those whose cars you are bending are liable to turn around and say, "OK, you do it then."

That is exactly what happened to Tory MP Kenneth Baker and his campaign for a national strategy on Information Technology. But far from being daunted by the prospect of having to translate his words into deeds, Baker is tackling the job with a zeal that shows he sincerely believes that technology will be the salvation of industrial Britain.

Baker was appointed Minister of State for Industry under Sir Keith Joseph just nine weeks ago, overseeing not just computers and electronics but the whole of the private sector of UK industry.

A large part of his time is spent in the Information Technology job, fortunately for the industry, because unlike most Ministers he has experience of the subject matter.

It is clear that the initiative for his appointment came directly from the Prime Minister herself, and the significance of this for the industry is hard to overestimate.

It was Baker who succeeded in convincing Mrs Thatcher of the vital importance of new technology for the future of the economy. It was he who got her to spend an entire morning last spring visiting systems houses in London.

The Prime Minister's commitment to the industry, vital if Baker's programme is to succeed, is now clearly established.

Baker achieved this despite his earlier connections with Ted Heath and his general image as an interventionist, in contrast to Sir

Keith Joseph's free trade leanings.

Does this indicate a change of tack on the part of the government? Without giving a blunt answer, Baker replies that in the Information Technology industry there is "a natural interface between the public and private sectors."

He goes on to explain that in this particular rapidly-changing field there is room for "intelligent intervention on a modest scale," to make sure the UK does not fall behind in Information Technology.

"The State has a clear role to play here," he asserts.

As an example he points to Inmos, without which, he says, the

"If there is no effect, the politicians only have themselves to blame - fate overtakes people because they do nothing."

UK would not have had a capacity in chip manufacture. "This was an omission on British industry's part," he says.

The project was "a good use of start-up money," Baker feels, and following a successful meeting with executive director Iana Baran the two are happy that no further State funds will be needed, and that outside partners will be found.

Baker is also happy with the role of another of Labour's creations, the National Enterprise Board. There is a serious gap in the market for providing venture funds, and the evolving (indeed, converging) roles of the NEB and the NRDC are important for filling the gap, Baker says.

Baker sees his own role as a dual one: missionary and salesman. A great deal of convincing needs to be done both inside government and outside in industry, commerce and education. Through the Cabinet Office Committee on Information Technology, Baker is acting as a link-man on government IT activity in such disparate areas as the Home Office, the Civil Service Department, and the Department of Education and Science.

"I have to enthuse them and act as a catalyst," he says, to get the new technology more broadly accepted in government operations and in what government brings about in the outside world.

As a start, he ordered a word processor (the first in the DoI) almost before he had done anything else on taking office. Now an Office of the Future is being planned for the Department, due for start-up in the summer, initially based on typing pools but later on providing communications between regional centres and London HQ.

Bright firms have been asked to make proposals for this "show-piece" system.

As a salesman for British products, Baker will be going to the US next month, and also to Japan for more general talks on "exchange of technology." Co-operation over the development of fifth-



Crusader for Information Technology Kenneth Baker is now looking to industry and the public for initiatives to help the cause. "I want ideas," he says.

generation mainframes will be one of the topics to be raised with the Japanese Ministry of International Trade and Industry, and Baker wants to start regular meetings between British Telecom and the Japanese PTT on "areas of mutual interest."

The Minister will also be seeing Fujitsu and Hitachi, companies whose achievements have "impressively impressed" him.

Baker has not yet succeeded in squeezing any more money for IT out of the public purse over and above existing programmes such as MAP and the Product Development Grants scheme. It could be forthcoming if the right ideas come along, he says. "I want more ideas," he emphasises, making it clear he expects these to come from the great inventive British public.

How capable is the DoI of judging these ideas and picking the winners, rather than picking the losers and throwing the winners in the wastebasket?

Are grants allocated on the Old

Boy network and according to Who You Know? Baker is complimentary towards the technical people in the Department. "We have very high calibre people here," he says, and points out that of the large number of proposals he was sent on taking office, only one was from a firm with which officials were not familiar.

Robotics in the UK is one field for which Baker expresses particular concern. "We are well behind Europe and I want to beef it up," he says.

As part of his fact-finding activities Baker now visits companies at a rate of about one a week. There are still plenty of people he has not yet seen, including UKITO, the "buy British computers" lobby, its European counterpart the IMA, and the European Commission.

The Mackintosh report to the EEC, proposing substantial aid for the European peripherals industry, has not yet come under his gaze, but he does comment that the UK peripherals business is in

reasonably good shape.

On the thorny issue of public sector treatment for leading Baker comments, "We try to do whatever we can." He adds, "I can't deny development grants to foreign-owned firms, and discrimination should not be great."

Wrapping up the whole in the style necessarily required

"It's not what the government is going to do, it's what industry is going to do."

all Ministers, he says with a smile. "We will follow a 'Real Deal' practice."

Baker believes passionately that it is to Information Technology that we must look to find the solutions to replace those in our dying industries.

But what does Britain have which to compete against the rest of the world? "A great deal of inventiveness," he replies. "The good thing about the technology is that development of new products is highly expensive and requires a great deal of high-tech, low-labour-cost countries will be able to overtake us in the future," he believes.

Does he think that a public efforts really have much effect on the way options and economies? "If there is no effect the public only have themselves to blame," he says. "I want more ideas," he emphasises, making it clear he expects these to come from the great inventive British public.

Baker is due in Seattle next week's time to give the government's view of the whole on being pressed about funding government action, and obviously "turns the argument around and explains, 'What is the government's role? What do we want? What do we do?'"

Even the most rabid interventionist would agree that in the working people that we have health we hope to acquire not too distant future.



Neuman Davies

Network products from new company

by Donald Kennett

A SPECIALIST networking company was launched last week by Information Technology Limited, to complement the activities of its computer manufacturing and office systems subsidiaries CTL and OTL.

The new company, Network Technology Ltd, aims to supply a range of digital networking and interfacing products designed to help companies make the best use of their communications links.

Managing director John Newman said that the first products to be sold would include the Terpac range of protocol converters made by Sit-Intel in France for use on the Transpac and Euronet packet networks, and the SM9200 range of switching multiplexers made by Digital Communications Corp in the US.

Later products would include a text message switch, ring and

Ethernet-like local area networks and private X25 networks, Newman said.

Backed by CTL's 15-depot service network, NTL will initially be headquartered in ITL's offices in Winchester. It is aiming to reach £1 million turnover in its first year.

Managing director John Newman and product marketing manager Dick Williams joined NTL from Kode, where they were group executive and data communications product planning specialist respectively. Sales manager David Bull has joined from Nexos, where he was sales manager for facsimile products.

NTL chairman Tony Davies, who is also chief executive of the holding company ITL, said the company was unlikely to manufacture - at least for the first five or six years - because the problem in the industry was to get volumes up and prices down, not to duplicate manufacturing effort.

ICL could make profit by 1982, says report

by Kevin Cahill

A STOCKBROKER'S analysis of ICL's financial position has concluded that the company is on the way to a pre-tax loss of some £28 million this year, but that this could be reversed to an £8 million pre-tax profit for 1982. The profit turnaround is based on a 10% increase in sales and a recovery in the gross profit margin on manufacturing.

The analysis, by Aziz Pannal of Henderson Crosthwaite, concludes that the company is a "viable investment in the medium term" provided the prospects of government support materialise. But it echoes ICL's chairman Philip Chappell's comment that the company's most serious problem is the outflow of cash. This was put at £88 million in last year's accounts and is set at around £74 million by Pannal in his report.

ICL had no comment to make on the report. Pannal states that savings of £20 million in employee costs might be

made this year but that even containing costs during 1982 will not significantly affect profitability.

Pannal is confident there are no worries over possible leasing losses at ICL, an element which causes City nerves following the collapse of Irel. The report points out that possible re-purchases are well covered by provisions in the 1980 accounts.

ICL's commitment to buy back equipment at net written down value. In 1979, for which the company made a provision of £7.8 million to give a total year-end provision of £21.4 million, re-purchases amounted to £9.6 million.

In 1980 provision of £19.1 million gives a year-end accumulation of £29.5 million, against actual re-purchases in that year of £11 million.

The report concludes that "ICL's trading target of breaking even in the second half of the year looks reasonably achievable" but that "the logic suggests ICL must attempt a major rights issue."

£100-a-day cash dispenser

by Keith Jones

BALANCE inquiries, account transfers, standing order payments, Access card withdrawals and payments, money deposits and cash withdrawals of up to £100 a day are some of the customer requirements that will be met by the Cashline cash dispenser service being introduced by Williams and Glyn's bank.

Already a major IBM user, the bank decided to go to IBM instead of its existing cash dispenser supplier, Chubb, for the Cashline units covering only in offline mode and are limited to issuing £20 amounts with a pre-printed card.

Williams and Glyn's is replacing the ageing Chubb units with 150 IBM 3624 dispensers over the next three years, and they will all operate online to the bank's computer centre at Lombard Street in the City of London where mainframe kit includes one 3031 AP (attached processor) and one 3701S8 ASO each with six megabyte of main memory.

The bank's choice of IBM 3624 units was much less of a rejection of competing dispenser models than a move towards even greater standardisation of IBM kit. The back offices of the bank's branches are to be equipped with IBM 3619 and 3604 terminal equipment as replacements for IBM 3980s.

£1 million City backing for Scottish viewdata adapter

By Donald Kennett

FUNDING to the tune of £1 million has been put behind production of a £165 viewdata adapter, to be the cheapest so far.

Ayr Viewdata's P1 adapter is being backed by a group of eight unnamed City institutions lined up by Sandy Gilmore of stockbroker Carr Seabag.

Only 100 units are to be made this month by subcontractor G.R. International of Perth, but Ayr's managing director Harry Thomas said he planned a gradual build-up to 6,000 units a month by the end of the year, with the company's own production starting around September.

Thomas expects sales to reach

£4 million by next March with exports playing an important part. "We have already demonstrated a teletext unit for Scandinavia and a Prestel adapter for the US which are different from the UK products," he said, "and we're working on a teletext adapter for the US which should be ready in three months."

The UK teletext unit, called T1, is to be produced from September at the same price as the P1. Both will be available at £112.20 in quantities over 5,000. "The market is so huge internationally," said Thomas, "it can sustain a company just producing these two products in increasing volume for 10 years at least."

The City investors have taken a 26 2/3% stake in the company, the rest of the shares being held by Thomas himself (63%) and the three new directors appointed last month: chairman Robert Keen, who comes from bankers Hill Samuel; production director and buyer John Dean, ex-Plessey and other electronics companies; and non-executive director John Edkins, a partner in a firm of accountants.

Sam Fedida, the inventor of viewdata, and Peter Kidd, formerly with television maker Murphy, have been retained as consultants on three-year contracts.

Other staff are to be hired when the factory starts up, in numbers

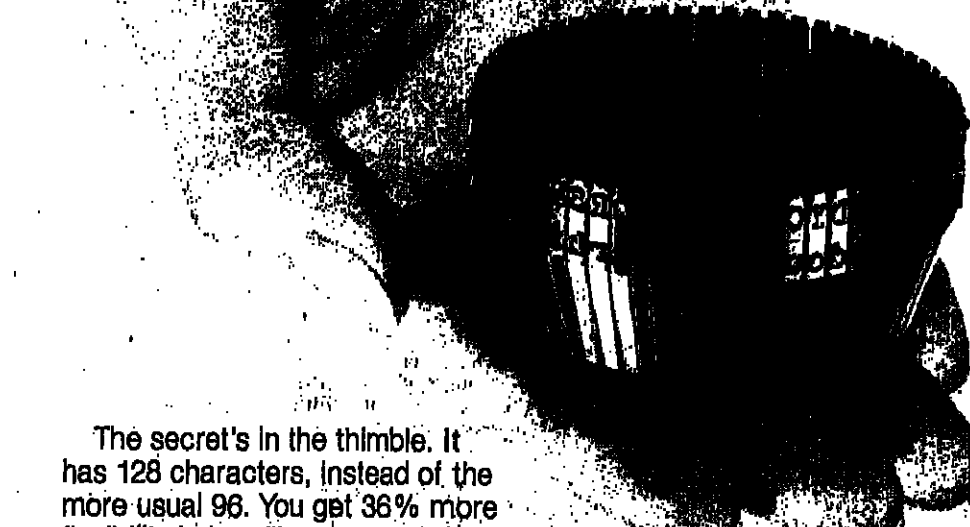
that depend on the eventual level of automation. The team is currently looking at automatic assembly and test equipment.

The viewdata adapter is based on the General Instruments chip set and the teletext adapter on Mullard chips.

They both use infra-red-based remote control keypads (which are not compatible with each other), but apart from that they have no frills such as printer, cassette or microcomputer interfaces - to keep them as cheap as possible. "But if someone wanted to order 20,000 units with interfaces we'd do it," said Thomas.

The first public demonstration of the adapter was at Viewdata 80.

You have every reason in the world to switch to NEC's "thimble" printers. There are 128 of them.

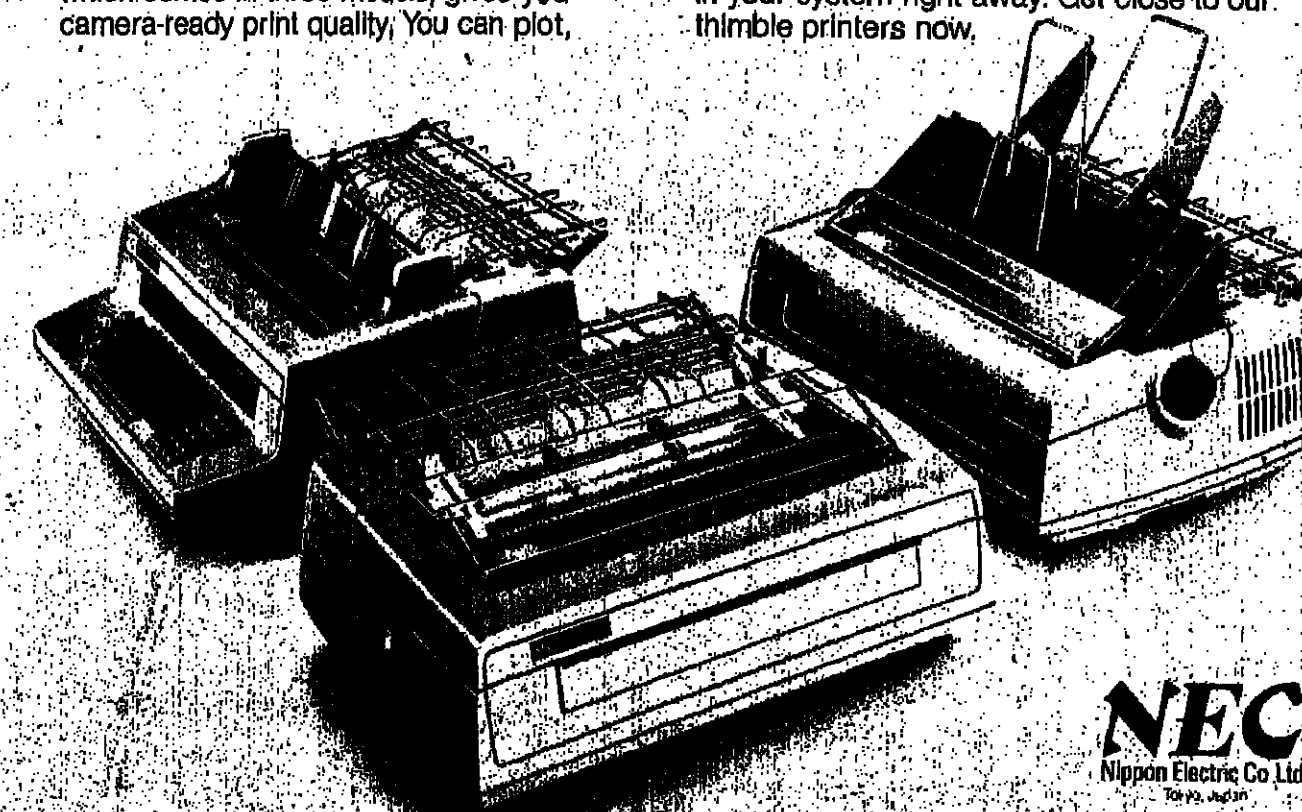


The secret's in the thimble. It has 128 characters, instead of the more usual 96. You get 36% more flexibility in handling paperwork than with most of the daisy-wheel and golf-ball print elements of other printers. In English, French, German, Scandinavian, name it. And one thimble will last more than 30 million clear impressions. Quietly, quickly.

And that's just for openers. Thanks to our own LSI and microprocessor technology, the NEC Spinwriter Series 5500, which comes in three models, gives you camera-ready print quality. You can plot,

graph, superscript, subscript, Tab horizontally or vertically. And print bidirectionally.

Changing thimbles and ribbons is a snap. Also, system modularity means your Series 5500 printer will grow as your requirements grow. And one of the nicest things about it all is that it really won't cost you a thing to switch. 7 interface capabilities, including those for Diablo, QUME and Centronics, means the NEC Spinwriter is ready to work in your system right away. Get close to our thimble printers now.



NEC
Nippon Electric Co Ltd

For more information, please contact:
NEC Telecommunications Europe Ltd, NEC House, 150 Wood Lane, Birmingham B70 7UJ. Tel: 01-359-6100. Telex: 331914.
Thames Systems Ltd, Thames Park Industrial Estate, Heath Road, Heath, Bucks HP12 3JF. Tel: (0494) 53471.

RIVA TERMINALS



ANADIX DP-9500 & DP-9501

Versatile 150 cps matrix printer range with high density graphics capability.

From £895



LEAR SIEGLER ADM-3A & ADM-3A+

The famous 'dumb' terminal (over 1,500,000 sold) and its bigger brother.

From £495



GRAPHICS ADD ON

Gives full vector drawing with complete Tektronix Plot 10 software capability to the ADM-3A/3A+

From £1295



LEAR SIEGLER 300 BALLISTIC PRINTER

180 cps full specification heavy duty cycle printer

From £1210



LEAR SIEGLER ADM-31

Two page display with full editing capabilities and four visual attributes

From £789



TELETYPE 43 TERMINAL

Popular 30 cps terminal available as KSR10 and paper tape ASH

From £776



SIEKO GP-80 PRINTER

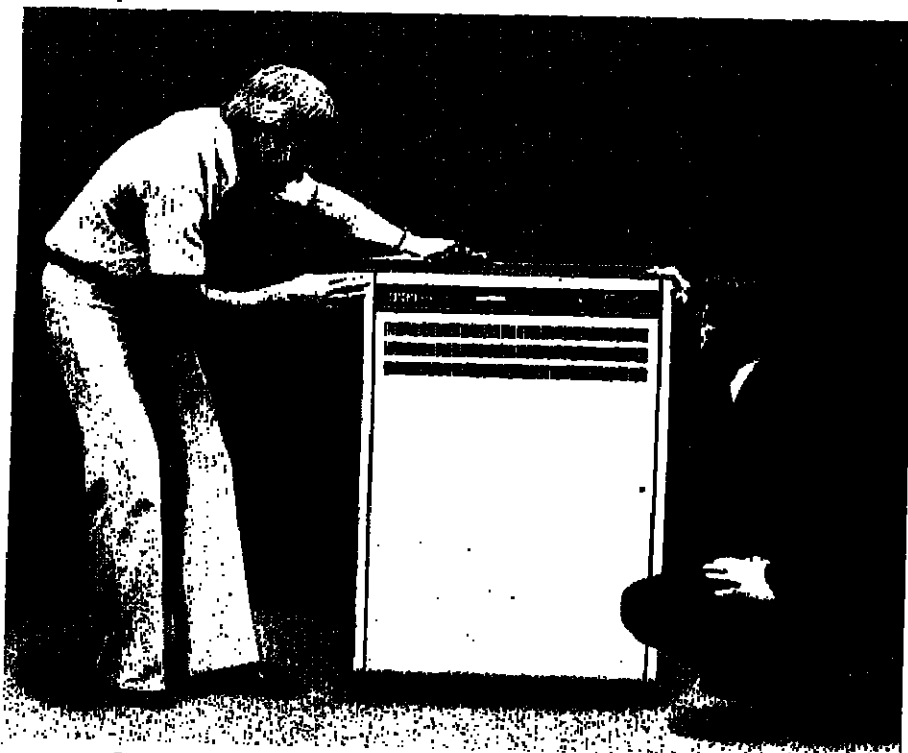
Lowest cost smallest sized 80 column impact printer in the world

From £250

FOR FAST DELIVERY WITH
FULL AFTER-SALES SUPPORT CALL:
Riva Terminals Ltd, Glenvale Park, Farnborough Road, Basingstoke,
Hants. RG24 0AP. Tel: 0444-5193. Telex: 337631.

Introducing a computer too small to be a VAX, but too powerful to be anything else.

Digital's new VAX-11/750.



It will change the way you think about computers.

Imagine. A VAX™ virtual memory computer for a price that almost any organisation can afford.

A computer with virtually unlimited programming space, contained in a cabinet so small it barely takes up the corner of a room.

Imagine VAX system power available to small departments. For dedicated real-time, interactive and batch environments. Distributed throughout your organisation wherever it can improve productivity. And in a whole host of new OEM and end-user applications that were never practical before.

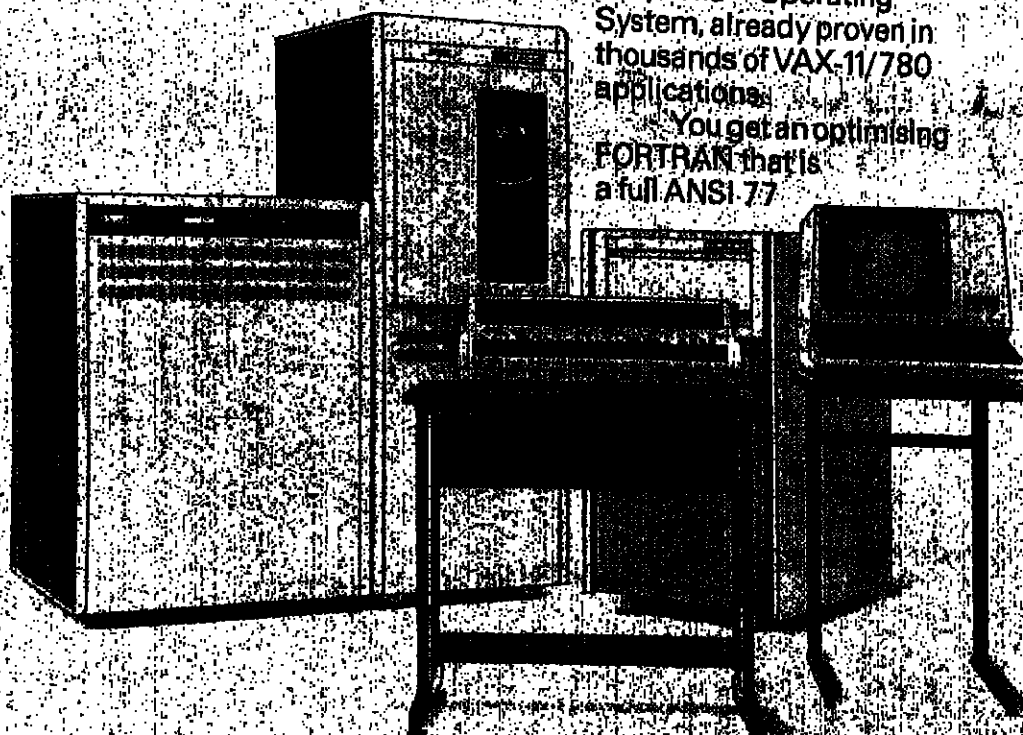
The VAX-11/750, from Digital Equipment Corporation, is so much computer for so little money it will literally change the way you think about computers.

VAX family compatibility.

Despite its size and price, the VAX-11/750 is totally software compatible with the larger, faster VAX-11/780 – the computer that has been setting performance standards ever since its introduction.

It has the same kind of real-time response. The same 32-bit addressing. The same powerful instruction set. The same two gigabytes of user program space.

And the VAX-11/750 runs the same VAX/VMS™ Operating System, already proven in thousands of VAX-11/780 applications. You get an optimising FORTRAN that is a full ANSI 77.



implementation. A high-speed COBOL based on current and anticipated ANSI standards. A PL/I in the same performance class as VAX FORTRAN.

Plus highly interactive BASIC, PASCAL, CORAL and BLISS.

Because the VAX-11/750 offers total family compatibility with the VAX-11/780, you can run all your application programs on either system. Using the same data management facilities that include sequential, random and multikey ISAM. FMS for screen formatting. DATATRIEVE for query and report writing.

And to make system performance complete, Digital has introduced its own RM80 Winchester disk, the latest in mass storage technology.

Distributed VAX power.

The VAX-11/750, combined with Digital's commitment to network leadership, adds a new dimension to distributed processing.

You can use the VAX-11/780 for centralised program development, and then run your applications on strategically located 11/750s.

You can link VAX computers together using DECnet™ networking software.

You can even build one comprehensive, corporate-wide network that includes PDP-11s, VAXes, Digital's large DECSYSTEMs, and your own corporate mainframe.

All working together and sharing resources.

State-of-the-art VAX reliability.

The VAX-11/750 is the industry's first "minicomputer" designed with custom LSI gate array circuits. This advanced circuitry means fewer components, lower power consumption, easier maintenance, and higher overall reliability. In fact, the VAX-11/750 is one of the easiest computers to maintain and service that has ever been developed. It can even be diagnosed over telephone lines from Digital's two Remote Diagnostic Centres in Europe. And VAX computers are supported by Digital's worldwide service organisation with more than 14,000 people in over 400 offices.

Imagine. The VAX computer is now the VAX family.

Now more people than ever can afford to bring Digital's architecture of the 80's into their applications. The VAX-11/750.

It will change the way you think about computers.

For more information, contact

Digital Equipment Co. Limited, Digital House,

252-256 Kings Road, Reading RG1 4HS.

Telephone: Reading (0734) 583555

I'd like to know more about the VAX family.

☐ Please send me literature on the VAX-11/750.

☐ Please send me literature on the VAX family.

☐ Please ask your representative to call.

My application is:

☐ Education ☐ Medical ☐ Laboratory ☐ Engineering ☐ Retail

☐ Business data processing ☐ Government ☐ Other.

Name _____

Title _____

Company _____

Address _____

Post Town _____

Telephone _____

Code _____

digital

We change the way the world thinks.

European flexible leasing operators hit back at critics

by Keith Jones

RECENT Press comment to the effect that the European Computer Lessors and Traders Association, Eclat, was not doing enough to control malpractice in so-called "flexible" leasing has led to a strong reaction from the association, which is made up of 28 operating lessors from all over Europe.

Eclat held a Press conference in London last week to clarify its position on operating leases that offer flexible terms to computer lessees.

Eclat pointed out that the whole attraction of an operating lease was its flexibility, the fact that the customer could lease a machine for a significantly shorter period than a finance lease, say five years instead of seven, and pay much less than the full cost of the machine over the lease period.

But abuses could occur, according to Eclat, with some of the flexible leases that offered the customer the opportunity to change his machine after, say, three years, for a more up-to-date model provided that the new lease was written with the same lessor.

In a few instances, commercial risks have been transferred to unknown parties in the lease contract, according to Eclat, which listed misrepresentation of the full term of the lessee's financial obligations, creation of two differing sets of documents for separate presentation to the lessor's source of funds and failure to identify clearly the party at risk, should the lessee exercise any of his options in the lease.

Eclat president Rene Aubron, of Promodata, Paris, said that the association was strongly in favour of the option of flexibility being available, and he knew of no firm within Eclat that had committed any of these abuses. But he pointed out that there were at least 100 other operating lessors in Europe, many of them very small.

One big UK operating lessor that does not belong to Eclat is Atlantic Leasing, well known for its Flexilease contracts. Atlantic boss John Foulston, pointed out that flexible leases were often no more expensive than

other operating leases, even though they usually covered a longer period, because the monthly repayments were lower.

He admitted that the customer would be in a bad position if his data processing workload was shrinking, because the value of the second lease had to be at least as big as the first, for tax reasons.

But Foulston agreed with guidelines outlined by Eclat that its members should represent fully the terms of the lease to the lessee and to the lessor's source of funds, and that every member should ensure that the lessee and the source of funds were aware of the lessee's full period of financial obligation.

Foulston commented that every Eclat member should also have to say that he intended to honour these commitments.

Eclat said that it knew of only one case in Europe of a customer being harmed by a "flexible" lease. The lessee, who was not in the UK, thought he could change his machine after three or five years, but was now stuck with it for 6½ years because the lessor had dropped out of the market.

Foulston said that he knew of three big computer users in this country who had been persuaded to lease machines on what appeared to be very flexible terms, who were now having to pay a full term's rental charges to the banks that financed the leases because the lessor had disappeared.

He estimated the people behind the lessor company concerned got away with £400,000. Worries about such companies led to an article last November 12 in the Law Society Gazette, reported in Computer Weekly, that warned about suspect flexible lease deals.

Foulston said that Eclat had "clarified" its position on flexible leasing because many of its members offered flexible lease deals, often involving a high risk to the lessor, and they were losing business as a result of the bad publicity about flexible leases.

Parry Mitchell, chairman of United Leasing and one of the most vocal opponents of flexible leases, refused to comment on the Eclat statements. He was not present at the Press conference.

RTZ calls for UK software awards

by Claire Gooding

THE accounting package Fascia, sold by RTZ Computer Services, has broken the £1 million barrier with a sale to Rolls-Royce Aero Division.

Fascia, which has been the subject of a worldwide sales push by RTZ, sells for about £10,000 and its wide-ranging success has prompted RTZ to propose that there be some sort of recognition for the British market such as ICP's Million Dollar Awards ceremony.

"We have suggested in ICP that they set up a British equivalent to the Million Dollar Award based on sales of a million pounds or more," said RTZ director Paul Methven.

So far ICP has dealt exclusively with the US market, although British firms have won recognition for their best-selling products in the past.

This year, however, ICP, a US publishing and survey firm is to hold a London-based awards and conference session at the Savoy Hotel on May 12 as a follow-up to the tenth Million Dollar Award Ceremony in San Antonio in April.

The London conference will focus on international software marketing.

The award ceremony is a prize-giving platform for the US and international software industry. Awards are given on the grounds of product performance and earnings. Among the successful British entries last year were Telcomputing, Safe Computing and MicroFocus with CTS Cabot.

The list of winners can be a useful guide to the fortunes of the market. Entry forms are available from ICP at 2 Denney Street, Park Lane, London.

It's the Hallmark of success

SOFTWARE specialist Hallmark Associates has recently won two orders for its ManuMark stock and production control package. One of the packages, worth £30,000, is being exported to Le Bozec et Gautier in France. The other order

has the same value and is from the British Sugar Corp. for use on an IBM 4341. Hallmark Associates (Computer Services) Ltd has no connection with Hallmark Business Systems, which recently went into receivership.



BUTCHER... Some unions only pay lip service to progress

'Luddite' unions holding up new technology—MP

COVENTRY MP John Butcher warned that unions such as Nalgo, Nupe and Apex might be putting the brakes on the development of technology, an area vital to Britain's future prosperity.

Speaking to an audience of software writers, dealers and users at the Gower software protection conference last week, he suggested that some unions paid lip service to the progress of technology but in reality took a Luddite attitude, as shown by Clive Jenkins' ASTMS white-collar campaign against "job-snatching" micros.

"If the unions push such views as 'Jill mustn't sit in front of a screen for more than an hour at a time', we may not get the benefit of products which could give us increased efficiency."

Butcher said that Britain should be "shouting as loud as we can" about existing bureaux and software houses, and putting public money into the private sector.

"Government should trust the industry and make better use of it," he said, saying that massive areas of central government could benefit from computerisation.

Methodology study

DIVERSE information systems design techniques within the DP community have caused an IFIP (International Federation for Information Processing) working group to conduct a comparative study of methodologies.

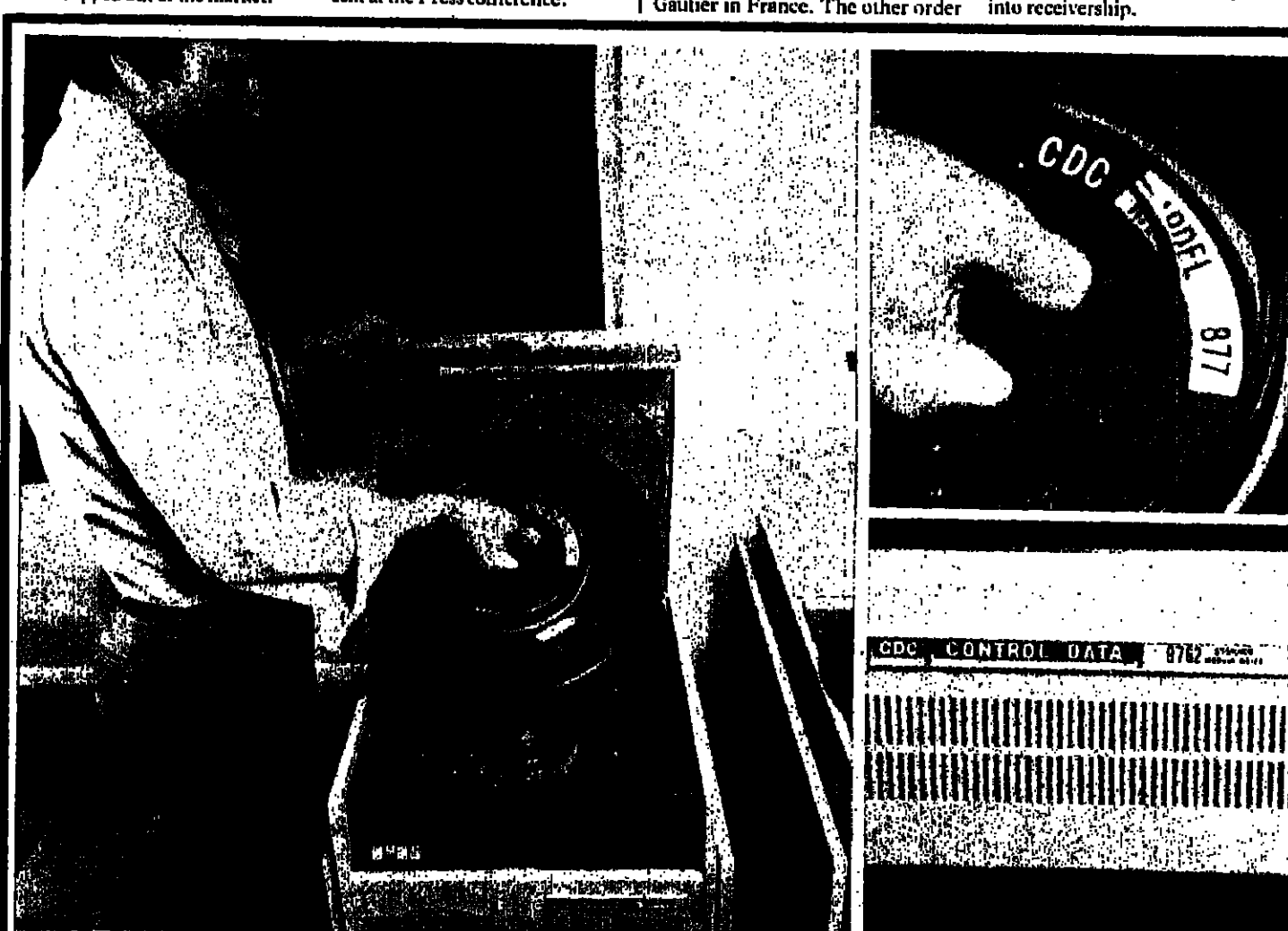
Groups of individuals who have developed information systems design methodologies are invited to submit specifications for a standard test case. The federation hopes to select several of the methodologies for presentation at an IFIP-sponsored conference, in May 1982.

Power to the end user

PROPHET and pundit of the software industry James Martin, best known for his database expertise, is now making his views known on the trend towards giving more power to the end user.

His report Application Development Without Programmers (published by Savant Research Studies of Camforth, Lancs) examines the reasons for the change of emphasis and status quo in the DP industry.

Martin examines the need for "fundamentally new methods of application development" looking at such factors as who the new users are likely to be, and what they will expect from a self-service system. He also looks at the implications the methods have for software firms and programmers themselves.



80 megabyte disk packs from Control Dataset.

Because you can't choose better than the world's leading brand.

The Control Data label on this 877 Model 80 mb disk pack places it in a class of its own.

It's the only media designed by Control Data for their world renowned Storage Module drive.

Today, more Control Data 80 mb packs are used on Storage Module drives worldwide than any other brand.

Share the confidence others enjoy when they buy the Control Data label. Just contact Control Dataset Limited for exclusive supply of all Control Data and ICL brand magnetic media.

You'll gain the services of Britain's most extensive and experienced manufacturing, sales and technical support organisation.

The biggest names in disk packs and cartridges from the nation's leading supplier. You can't choose better than that.

Call Control Dataset on 0438 3322.

Control Dataset Limited, P.O. Box 16, Argyle Way, Stevenage, Herts. SG1 2AB.

CONTROL DATASET
GD
CONTROL DATA

OFFERING 1219

Two-page report from the Gower software protection conference, held last week, entitled Killing the Pirates

Feelings run high on the pros and cons of protection

OPINION was sharply split among speakers and delegates. Some were concerned about providing some sort of physical protection to forestall thieves; others felt that such methods could only be short-lived and in the long term were against the interests of the industry.

"I don't think that there's anything we've heard of today that would seriously deter a determined 15-year-old, given an hour or so to crack it," said chairman Peter Laurie, editor of Practical Computing.

Others were against the idea of physical protection because they felt that on principle, software should be easily usable and portable, both aspects affected by attempts to stop copying facilities. The feeling among users was itself, as some devices

aim to do, was throwing the baby out with the bathwater.

Ian Litterick, who is both a user and a writer of software, suggested that there were justifiable reasons for occasionally breaking the rules, and Mike Gurr put the cat among the pigeons by suggesting that a lot of software didn't deserve protection however many man-years of development it had taken, because much of it merely re-invented the wheel.

Software copyright expert Alistair Kelman was firmly on the side of any device that would protect owners' rights, be it a physical deterrent or a strong licensing agreement. The most important thing, he stressed, was to plan for piracy and have contingencies built into all marketing agreements or sales strategies.



Litterick... "I'm a software thief - who isn't?"

Why pirates now outnumber legitimate users

A LAST-MINUTE speaker at the conference was Ian Litterick who bravely titled his talk Why I'm a Software Thief. Three hands went up when he asked the audience of 60 "Who isn't?"

Later he told Computer Weekly that he was surprised there were so many who hadn't found it necessary to break the rules in some way.

Litterick dealt with the subject of illicit copying, rather than piratical bootlegging where someone sells for profit a product on which royalties should be paid to the author or owner. Copying is still a cause for concern, as for every copy borrowed or made for a friend, the owner loses a sale.

This, Litterick implied, might be the suppliers own fault, brought about by overpricing and lack of support.

Litterick argued in defence of a user's right to copy a package under certain circumstances. He is a user and an author of software products, and carried out the national Microsystems Centre feasibility study for the NCC and DoI, and he gave three justifications for software piracy.

He put the blame firmly on the software industry itself, for not providing reasonable documentation and evaluation. "Sometimes one finds useless software on sale - I want to be able to evaluate a package before I buy it," he said.

He also hit out at the "rip-off price for documentation" which was the only way of properly evaluating a package without hands-on testing. Articles in computer journals didn't give him the details he needed when it came to judging the quality of software, he said, and borrowing a copy was often the only way of testing it.

"Having tested it, I maintain that if it's a good package there are good reasons why I should go on to buying it myself," he told the audience. Support and maintenance, as well as updates to the software, were the main factors in favour of purchase rather than "borrowing".

Licensing, a method most strongly recommended by many who joined the debate, also came in for some flak from Litterick. "I need a backup for my system. It's only sensible to copy the data used with an application on the same disc, to save swapping discs all the time. There are some software licences which limit copying. Licences which ask me not to make backup copies are devalued by the fact that I'm going to have to break them anyway."

This, suggested Litterick, would not be such a bad thing if the industry might develop parallel with the publishing world, "where an author doesn't publish his own books - he goes to a publisher for the backing and the hype. It's cheaper to buy a published book and then resell it than to produce one himself. Why shouldn't it be the same in the software industry?"

He felt that licences were a user to legitimately use the software on one machine. "Suppliers should ask the full price for the software when the system is only being used on one system. It's through some companies who do this in consideration, this argument won some sympathy, especially from one delegate who had paid full price for backup copies."

Litterick's third target, often as an excuse for some of the best copying that goes on, was the marketing methods, or lack of them, used by some suppliers.

"It will always be quicker and easier to borrow a copy from a friend. Keeping people happy around and not answering correspondence isn't the answer to the problem." Too often, he said, a registered user and from whom on received no support and no response to inquiries or complaints. Indeed, there seemed to be no advantages to being a legal purchaser rather than an illicit copier.

He called on software suppliers to offer effective support as a incentive to illicit copying, and drop the price of software so that buying a package became preferable to stealing it. "A cheap mass-market software package should sell for little more than the cost of copying it. And I'm not suggesting support comes free - manufacturers should unbundle support and charge for it. I would pay for a newsletter of updates, a user's guide," he said.

He felt that licences were a user to legitimately use the software on one machine. "Suppliers should ask the full price for the software when the system is only being used on one system. It's through some companies who do this in consideration, this argument won some sympathy, especially from one delegate who had paid full price for backup copies."

Litterick's third target, often as an excuse for some of the best copying that goes on, was the marketing methods, or lack of them, used by some suppliers.

"It will always be quicker and easier to borrow a copy from a friend. Keeping people happy around and not answering correspondence isn't the answer to the problem." Too often, he said, a registered user and from whom on received no support and no response to inquiries or complaints.

Indeed, there seemed to be no advantages to being a legal purchaser rather than an illicit copier.

He called on software suppliers to offer effective support as a incentive to illicit copying, and drop the price of software so that buying a package became preferable to stealing it. "A cheap mass-market software package should sell for little more than the cost of copying it. And I'm not suggesting support comes free - manufacturers should unbundle support and charge for it. I would pay for a newsletter of updates, a user's guide," he said.

He also hit out at the "rip-off price for documentation" which was the only way of properly evaluating a package without hands-on testing. Articles in computer journals didn't give him the details he needed when it came to judging the quality of software, he said, and borrowing a copy was often the only way of testing it.

"Having tested it, I maintain that if it's a good package there are good reasons why I should go on to buying it myself," he told the audience. Support and maintenance, as well as updates to the software, were the main factors in favour of purchase rather than "borrowing".

Licensing, a method most strongly recommended by many who joined the debate, also came in for some flak from Litterick. "I need a backup for my system. It's only sensible to copy the data used with an application on the same disc, to save swapping discs all the time. There are some software licences which limit copying. Licences which ask me not to make backup copies are devalued by the fact that I'm going to have to break them anyway."

This, suggested Litterick, would not be such a bad thing if the industry might develop parallel with the publishing world, "where an author doesn't publish his own books - he goes to a publisher for the backing and the hype. It's cheaper to buy a published book and then resell it than to produce one himself. Why shouldn't it be the same in the software industry?"

He felt that licences were a user to legitimately use the software on one machine. "Suppliers should ask the full price for the software when the system is only being used on one system. It's through some companies who do this in consideration, this argument won some sympathy, especially from one delegate who had paid full price for backup copies."

Litterick's third target, often as an excuse for some of the best copying that goes on, was the marketing methods, or lack of them, used by some suppliers.

"It will always be quicker and easier to borrow a copy from a friend. Keeping people happy around and not answering correspondence isn't the answer to the problem." Too often, he said, a registered user and from whom on received no support and no response to inquiries or complaints.

Indeed, there seemed to be no advantages to being a legal purchaser rather than an illicit copier.

He called on software suppliers to offer effective support as a incentive to illicit copying, and drop the price of software so that buying a package became preferable to stealing it. "A cheap mass-market software package should sell for little more than the cost of copying it. And I'm not suggesting support comes free - manufacturers should unbundle support and charge for it. I would pay for a newsletter of updates, a user's guide," he said.

by Claire Gooding

Users get free copies from careless dealers

ONE of the delegates at the software protection conference has some interesting suggestions as to the way in which many of the "leaks" occurred.

Nick Horgan of Circle Software pinned much of the blame on dealers, saying that often a demonstration copy would find its way into a user's premises and would stay there, in use and unlicensed, because the dealer or salesman could not be bothered to collect it.

He had also had the experience of finding obvious copies "hanging on the wall in a shop". Having been tipped off by someone, he investigated and then confronted the dealer with his suspicions. "They were most apologetic and offered to pay for those in the shop, and of course they'd been done by a programmer who'd since left the usual story."

The other main problem he had found was the swapping and "borrowing" of packages purchased by one company and then passed on to colleagues or other departments.

To find more evidence of the problem, Computer Weekly asked the opinions of people on both sides of the user/supplier fence.

Predictably, most user groups see themselves as existing for the benefit of suppliers, who canvass users for suggestions on improvements to packages, as well as for the laudable aim of user education and sharing of knowledge.

The general opinion seemed to be that "copying does go on, but it's between individuals, usually friends, and by no means endorsed." One spokesman for the CP/M user group said "Microsoft's Basic is a prime victim. As for TRS80 software, if what I've heard said is true, then it's a wonder there's any market for it at all, given the speed at which programs whip round between users."

Paul Handover of Dataview, whose suspicion that 25% of Wordcraft sales went lost through copying led to the invention of the dongle, told us: "Most dealers know that if you sell unprotected

software to a large group of users it quickly gets passed around from department to department. They seem to think they have a right to copy it."

It's not uncommon for our engineers to come across black market copies. Last Friday an engineer was called out to a firm in Cambridge only to find that the cause of the fault was an illegal copy of the Programmer's Toolkit."

The Toolkit was recently the subject of another case concerning alleged piracy. "The client was embarrassed at being caught out, but there was nothing we could do about it, or about the waste of four hours of our engineer's time," said Handover. "Catching them is only half the story."

The law had to establish a better definition of copyright. Until the government assists the market with protective legislation we can't do anything even if we catch them. And who are we to spend thousands on creating a legal precedent?"



"I BELIEVE that if a package is good enough to be pirated then the author should sell it at a price that makes it totally uneconomical (in real terms) to pirate it," said Mike Gurr, who spoke on some technical aspects of software protection.

Gurr brought the audience's attention to a piece of software called the Locksmith, sold in the US by Sensible Software, which promises to copy any Apple program, protected or not.

"It's a lethal piece of software," David Lowe told Computer Weekly. Lowe's company ACT Microsoft is presently involved in a case concerning alleged illegal copying of Visicalc.

'User groups are thieves' kitchens'

"WE must work for the elimination of these user groups," said software copyright expert Alistair Kelman. "Most of them are nothing but thieves' kitchens." He was alluding to the practice of some groups, of "sharing" software packages possessed by members.

He fiercely contested the view that such groups were a necessary protection for users against shoddy software. He said that he supported any means by which the legal owner could protect his investment in software.

Whereas the law on software copyright is indistinct at present, documentation in paper form is clearly copyrightable and can provide some protection from piracy.

He also found a flaw in Ian Litterick's argument that the industry would eventually parallel book publishing, with an author getting a software publisher to back his product.

"A well-known author can get an advance on his work. But if there's to be no form of protection, then investment in software development is money thrown away. Who would back a new product on those terms?"

Kelman sees the creation of the law on software copyright, on which Britain has no clear policy, as essential to the health of Britain's software industry. His own proposed Bill, which uses the term "transmutation" to clarify what and what is not illicit copying, is presently being looked at by Lord Lloyd of Kilgerran at the House of Lords.

While the Green Paper on the issue is now long overdue, Kelman does not want to see the UK rushing into legislation as the US recently did, with a bill which he considers "seriously damages American copyright law."

Recent efforts by the EEC to harmonise the law in Europe are going to run into trouble with 38 various national laws to contend with, observed Kelman, and the matter was becoming increasingly urgent as wideband communications, data highways and satellites developed the international software market.

Other solutions, such as patents, do not look as unlikely as they used to, and there has been a noticeable change in attitude in British courts dealing with the issue in the last six months.

Deterrents

BESIDES the unattractive solutions of induced dependence, bobby trapping and harassment, there were other means for a victim to protect his interests, said Julian Allison. They included lawsuits, embarrassment of offenders through word of mouth and press campaigns, and legal harassment, not, he stressed, the knee-capping methods resorted to have been used in the US.

Even better, he suggested, were positive measures such as superb documentation, printed in colours which would resist photocopying.

Law is safety net

CHAIRMAN Peter Laurie, who as editor of Practical Computing has long called for a clear law on software copyright, suggested that at the moment contracts with named users, and coding their names into the program, provided some sort of protection in that guilt for piracy can be proved. But the law is still sorely needed as a safety net.

"It's all very well," observed one delegate, "as long as having caught a pirate, one could be sure that the courts would recognise his act as a breach of copyright."



Allison (right)... "If I was starting now, I'm almost sure that... I'd decide to be a pirate." Peter Laurie looks on.

Illicit cassette trade

From front page: "From front page: users at dealers who buy licences from companies which have no right to sell, making an almost impenetrable legal tangle."

Another industry favourite is the sale of cut-price software through hardware engineers. The only times up to look at the disc drives and intentions that he just happens to be the agent for a special offer, 90% off, cut-price software.

We mentioned this to one company concerning one of our engineers and the only reaction we got was "Thank God it wasn't one of our packages!" I think the engineer involved is still working for them.

Given the dwindling market for micro packages and the data, possibly under-estimated, collected on piracy, "it is not unreasonable to expect the law to be a last resort," said Allison.

Moving from piracy to illicit copying, he pointed to on user groups who often hand together and pool resources to buy a particular package which is then circulated. "It's also endemic in education," said Allison. "It's not unusual to have routinely copied floppy disks. Packages are

bought and then circulated". Sometimes, he suggested, user groups indulged in busting protection for the sake of it. Recently one user magazine actually published the key to the 100,000 seller, Microchess.

Whereas this sort of illicit copying used to represent 99% of the problem, Allison said, the emphasis was about to change and the number of true piracy cases was getting larger.

One software dealer's list had dwindled from 200 products to 12 in a couple of years because "on purely commercial terms" it was only worth their while to sell the packages with really good protection.

The final sufferers, he said, were the users who found that programs they wanted had been withdrawn, because they could no longer pay for their place in the catalogue. Suppliers were becoming loath to publish and promote - although there were ways of preventing the copying of documentation, such things were expensive. Overpricing, lack of support, and reluctance to invest in development were likely to be the long-term effects.

Your computer should spend its time solving problems not looking for them.

It happens at a lot of companies. The computer gets burdened with more and more trivial information from everyday documents.

Invoices, delivery notes, employee records and suchlike. Until it becomes little more than an automatic filing system answering queries all day.

Kodak has an alternative. It's called the KODAK IMT Microimage Terminal IES.

It's quite simply a microfilm reader that, when linked to a computer, will relieve it of all the "paperwork" it is storing.

With a little help from the computer, it can actually give you a copy of any document you need in seconds.

And, most important, it saves on expensive computer storage leaving the computer free for more complex work.

The KODAK Komstar Microimage Processor is another highly advanced computer peripheral.

Linked to your computer it will actually produce print-out on microfilm.

Unlike previous COM set-ups it is completely dry; there are no chemicals whatsoever involved.

If your company uses microfilm you should find out more about these latest developments from Kodak.

Start by filling in the coupon. We'll make sure you're running a computer. Not a filing system.

KODAK Microfilm



To Hilary Bell-Dillon Kodak Limited, Microimage Sales, Box 66, Hemel Hempstead, Herts HP1 1JU. Tel: Hemel Hempstead (0442) 61122.

Name _____

Position _____

Company address _____

Telephone _____

Handwritten note: "If I was starting now, I'm almost sure that... I'd decide to be a pirate." Peter Laurie looks on.

Argus 700 Series 2.

Multipower multispeed multichoice multiprocessor.

Flexibility

Argus 700 Series 2 is based on new versions of the Argus 700F and G central processors which can be used individually or in closely coupled groups supported by a multiprocessor operating system.

In its various configurations it's a package designed to meet the needs of almost all control, communications and information handling applications. A cost effective system, competitively priced.

Speed

At the top end of the range Argus 700 Series 2 offers processing speeds of up to two million instructions per second.

There's a local and cache memory for each Argus 700F and a cache memory for Argus 700G. Result: reduced load on the memory bus, speeding processing by as much as 60%.

Reduced Load

Intelligent channels with fixed programmes handle routine operations. They have access to the memory bus and operate in parallel with central processors, reducing the central processors' load substantially.

Security

No other computer company has more experience than Ferranti in designing dual computer systems for critical, high security tasks.

The architecture of Argus 700 Series 2 provides for pairs of computers to share memory and backing stores and to access common input/output drivers.

From the system builders. The system builders' computer.

Contact: Equipment Sales, Ferranti Computer Systems Limited, Simpson Way, Wythenshawe, Manchester M22 5LA. Telephone 061-4993355 Telex 658064.

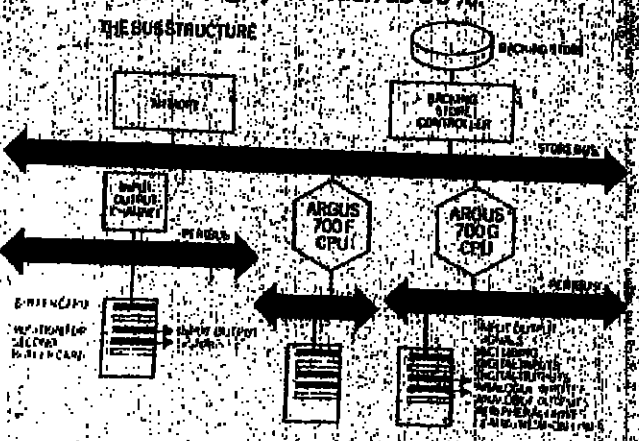
Name _____

Position _____

Company _____

Address _____

FERRANTI Computer Systems



Scan Data beats target— but no divi this year

SCAN DATA International, the West Sussex mini supplier and software house, has handily exceeded its profit forecast for 1980.

Against predictions of a £250,000 profit, the company has produced a gross profit before tax of £281,000. This is almost double the 1979 figure of £149,000.

Turnover was also up substantially, from £1,855,000 in 1979 to £2,533,000 in 1980.

As declared in the company's prospectus when it placed its shares on the unlisted securities market last year, no dividend will be paid. Retained earnings per ordinary 10p share were 12.14p, against 6.48p in 1979.

The shares, already up 95p on the November launch price of 125p, rose 10p to 230p on the news of the profit.

This places the company on an effective price earnings ratio of 19, which means that the price being paid for the shares is 19 times the expected earnings of the company. Ratios like this are common where there is either expectation or

promise of substantial growth, and have been occurring in America recently where Apple stock at one point was on a P/E of over 200.

Scan Data has been moving more directly into the mini and micro business in the past six months. Late last year, following the sale of its computer bureau centres, the company announced that it would be concentrating its business into distinct areas.

Scan Computers will focus on the minicomputer hardware and software offering TI, Multibus and Commodore equipment.

The company uses leasing facilities, arranged through third party contacts. This gives Scan the benefit of instant capital payments from the leasing companies, while being able to offer its customers a popular form of equipment financing.

Through its maintenance division the company offers an online remote diagnostic service called Scan Care. With this service Scan engineers are able to interrogate a customer's computer system from

Scan's premises, and prepare maintenance or repair boards in advance of calling on the customer. In practice many faults are fixed without the expensive overhead of an engineer's visit.

Martin Baldwin, managing director of the group, told Computer Weekly that the trading environment was still very difficult and he would not wish to make any forecasts until changes in the economic climate became clearer.

The company is now offering the micro supplied by Onyx in the US.

Baldwin did observe however that he expected the price of business computers to fall in real terms. On that basis he said that Scan intends to head up-market to counteract the deflationary effect on profits of the fall in unit cost of processors. Scan Data expects to take the 16-bit version of the Onyx machine into markets in which it was not previously active.

The company, he said, would also be looking to expand geographically, but would be avoiding the scientific and military fields.



Discussing the £125,000 investment in Telema are Elizabeth Wood, computer analyst with Greene and Co; John Scholes, technical director of Telema; and Simon Knox, partner of Greene and Co.

City money for Telema

TELEMA, the Cheshire-based microprocessor supplier has raised £125,000 from a consortium of City investors headed by Lloyds Bank investment management division.

The consortium putting up the money was organised by Greene and Co, the stockbrokers who specialise in computer industry analysis and was given to Telema

in return for 32% of Telema's shares.

The financing operation was conducted on the basis of Telema's current sales or firm orders for over 50 of the company's Mercator supplied machines. Each sale is estimated to be worth £11,000 to £12,000, with perhaps £4,000 for what the company calls the skeleton software.

Telema managing director Ian Hilton says the company expects to install over 150 machines in its next financial year.

The Telema 1000 supplied by Mercator in the US is based on the Z80 processor, with hard disk capacity of 10 megabytes and tape cassette capacity of 12 megabytes included in the basic machine unit.

Atlantic signs more deals— but profits slip £100,000

ATLANTIC LEASING, the biggest independent computer leasing company in the UK, is finding the going tougher since IBM slashed the prices of its 4300 systems.

In preliminary figures just released, the company reveals profit for the year at £1,037,000 against £1,164,000 in 1979, a decline of over £100,000.

Turnover, despite substantial leasing deals with Lloyd's, the UKRA and the Dutch government, fell from £16,955,000 in 1979, to £16,280,000 in 1980.

This is despite a 28% rise in the number of leasing deals signed during the year.

The company, while not primary blame for the erosion of its profit margins on the low IBM prices, also indicated that the average value of leasing deals had fallen.

High interest rates in the UK also contributed to the decline in volume growth of turnover, according to the company, and the prospect of a general fall in interest rates which the company hopes will lead to a general improvement in profits in 1981.

Atlantic has increased its operation on the Continent and looks to provide much of its growth in 1981.

CW SHARES TABLE

Date: 02/01 Index: 98.10 Change: +0.87

Price	London Stock Exchange	Price	Change	Price	Change
100	100	100	100	100	100
101	101	101	101	101	101
102	102	102	102	102	102
103	103	103	103	103	103
104	104	104	104	104	104
105	105	105	105	105	105
106	106	106	106	106	106
107	107	107	107	107	107
108	108	108	108	108	108
109	109	109	109	109	109
110	110	110	110	110	110
111	111	111	111	111	111
112	112	112	112	112	112
113	113	113	113	113	113
114	114	114	114	114	114
115	115	115	115	115	115
116	116	116	116	116	116
117	117	117	117	117	117
118	118	118	118	118	118
119	119	119	119	119	119
120	120	120	120	120	120
121	121	121	121	121	121
122	122	122	122	122	122
123	123	123	123	123	123
124	124	124	124	124	124
125	125	125	125	125	125
126	126	126	126	126	126
127	127	127	127	127	127
128	128	128	128	128	128
129	129	129	129	129	129
130	130	130	130	130	130
131	131	131	131	131	131
132	132	132	132	132	132
133	133	133	133	133	133
134	134	134	134	134	134
135	135	135	135	135	135
136	136	136	136	136	136
137	137	137	137	137	137
138	138	138	138	138	138
139	139	139	139	139	139
140	140	140	140	140	140
141	141	141	141	141	141
142	142	142	142	142	142
143	143	143	143	143	143
144	144	144	144	144	144
145	145	145	145	145	145
146	146	146	146	146	146
147	147	147	147	147	147
148	148	148	148	148	148
149	149	149	149	149	149
150	150	150	150	150	150
151	151	151	151	151	151
152	152	152	152	152	152
153	153	153	153	153	153
154	154	154	154	154	154
155	155	155	155	155	155
156	156	156	156	156	156
157	157	157	157	157	157
158	158	158	158	158	158
159	159	159	159	159	159
160	160	160	160	160	160
161	161	161	161	161	161
162	162	162	162	162	162
163	163	163	163	163	163
164	164	164	164	164	164
165	165	165	165	165	165
166	166	166	166	166	166
167	167	167	167	167	167
168	168	168	168	168	168
169	169	169	169	169	169
170	170	170	170	170	170
171	171	171	171	171	171
172	172	172	172	172	172
173	173	173	173	173	173
174	174	174	174	174	174
175	175	175	175	175	175
176	176	176	176	176	176
177	177	177	177	177	177
178	178	178	178	178	178
179	179	179	179	179	179
180	180	180	180	180	180
181	181	181	181	181	181
182	182	182	182	182	182
183	183	183	183	183	183
184	184	184	184	184	184
185	185	185	185	185	185
186	186	186	186	186	186
187	187	187	187	187	187
188	188	188	188	188	188
189	189	189	189	189	189
190	190	190	190	190	190
191	191	191	191	191	191
192	192	192	192	192	192
193	193	193	193	193	193
194	194	194	194	194	194
195	195	195	195	195	195
196	196	196	196	196	196
197	197	197	197	197	197
198	198	198	198	198	198
199	199	199	199	199	199
200	200	200	200	200	200

The table shows the closing prices in American on Thursday and the mid-day prices on Friday for London. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.

* Shares traded under the Unlisted Securities Market or under Rule 14(1)(a).



Second in our series on starting your own company

The best way to get a loan from your local bank manager

IN the second of our series on how to set up and run a small computer company, we look at the early stages of a small company's life, and at the kind of problems likely to be encountered by a small company as it begins its first financial relationships.

Most small companies need external financing above and beyond what their founders can provide. Some may even need external financing to get off the ground. For most computer companies the initial dealings will be with one or other of the high street banks.

The object of this article is to look at the services provided by the main high street banks and to consider the best way to approach your local manager for a loan or overdraft.

proposing and if the loans you are likely to want to fit the manager's concept of you as a person.

If you don't have an existing relationship, or are proposing to start up a new one, the following are the key points a bank manager is going to look for when he decides how much, if anything, he is going to give you.

Firstly, if he doesn't know you, he will want to be able to check your financial records. The best referee is someone who already knows the bank you have approached. If you don't have a referee of that kind, then someone with the kind of status that will mean something to the manager is next best.

Secondly, do you have a practical cash flow statement, such as we outlined in the last article?

Finally, do you look as if you have the determination to see your idea through? One way a bank manager will assess this is to see how well you have done your homework and how few notes he has to take. This does not preclude a preliminary chat before you set about your cash flow constructions, but when you go in asking for money you will be expected to present a businesslike approach.

How much to ask for.

A good cash flow will tell you how much you need, but there are other constraints, some of which are shown in the table below, in terms of what banks are willing to lend. One constraint may be the amount of security the bank wants, which in turn will relate to the riskiness of your project and your own business experience.

When deciding how much you want you should also look at the kind of money you want (ie, the type of loan).

All the clearing banks offer overdraft facilities, but remember that overdrafts are open to instant recall by the bank.

In one way or another each of the clearing banks offers various special loans for setting up businesses and it is usually possible to negotiate an acceptable agreement between yourself and a bank.

The key things to look at when seeking a loan are the repayment

terms and the interest rate.

If you are into manufacturing your first chip-based device, the last thing you want is a loan that you have to start repaying the month after you get it. Unless you already have a strong cash inflow, insist on the repayment "holiday" that most banks will offer on new business loans.

The easiest term of interest is obviously the one offered by Barclays on its business start loan where you don't pay interest, but do pay a share of royalty on sales. Always ask for enough at the start, if you can. It is never good to have to keep coming back to ask for more money.

Who are the high street banks?

The principal high street banks, often known as the clearing banks, are Barclays, Midland, Lloyds, National Westminster and Williams and Glyn, and in Scotland, the Royal Bank of Scotland. Between them they have 20,000 branches and are represented in almost every city, town and village in the UK.

In recent times a number of other organisations have begun setting up a branch network in the UK. The most important of these are the American Banks, Citibank, Bank of America and Canadian Pacific.

The American banks are often staffed by ex-high street bank staff. You will generally find the approach more informal than the average clearing bank branch, but you may find that the Americans are tighter on insisting that specific repayment terms are met. Also, the overdraft is not as popular with the Americans as with UK banks.

The two Irish clearing banks, Allied Irish and the Bank of Ireland have branches in the big cities in the UK and operate in a similar way to the high street banks.

Kevin Cahill will look at the other types and sources of funds available to computer companies. This will not appear until after the Budget on March 10, when major changes are expected in the way small businesses can offset investment against tax.

Backing of C&I for Midas

THE industrial holding company, Commercial and Industrial Securities Ltd, has taken a minority shareholding in Midas, the West Sussex distributor of Sord computers.

The Sord range of systems, which are also sold in this country by Exleigh Business Systems in Penance, is beginning to show the kind of growth pattern commonly associated with Apple. Sord now manufactures in Japan, China and Dublin, and sales have risen in four years from less than £250,000 to over £20 million worldwide.

The logic of the merger between Midas and Commercial and Industrial Holdings is not immediately clear. C & I's other interests are concentrated in building contracting, engineering and mobile homes.

Reuters speeds deals

REUTERS, best known for its news services, launched a new international money dealing system last week.

The service, which is available in the US, Canada and seven European countries including the UK, was started simultaneously in all nine countries and will enable banks to execute money deals direct from the terminal on which the latest money rates in each country are available in each country.

The dealing system, which took over five years to develop, and which cost £8 million, is running on 18 DEC machines scattered around Europe and North America.

In each office which uses the system there is a mini computer to handle the transactions locally.

Graphic sales

RAMTEK, which claims to be the world leader in colour scanner graphics, one of the most dramatically expanding computer oriented markets in the US, had sales up 31% on a quarterly basis.

Sales for the second quarter of 1980, which ended December 31, were \$8.1 million against \$6.2 million for the same quarter in 1979.

The company has expanded in Europe by taking new offices near Amsterdam and appointing three new senior managers.

US terminal sales take a tumble

A BIG SLOW-DOWN in the growth of display terminal sales in the US over the last year is highlighted in a study* on the US display terminal market up to 1985, carried out by the US consultancy Advanced Resources Development. Printer manufacturers also face a rough time because of tough economic conditions and fast technological changes according to a study** on the worldwide printer market up to 1985 published by another US organisation, the American Computer Appraisal Service.

The Advanced Resources Development study blames high interest rates and a recessionary economy in the US for the comparatively feeble 18% growth rate in display terminal shipments during 1980.

The study points out that the display terminal industry has traditionally achieved annual growth rates of 30 and 35% and that US manufacturers started 1980 with high backlogs and expectations of growth rates exceeding 30%.

Growth at the low end of the

market in 1980 was a relatively strong 20% mainly because of increased production and delivery of the Digital Equipment VT-10

Eleven guidelines for evolutionary design and implementation

I HAVE discussed the evolutionary method of delivering and designing systems in several earlier columns, but it is still a hot topic requiring a lot more space than a column can ever give.

A week ago I used a day to demonstrate the potential of this method for simplifying the delivery process for a gigantic social welfare system (old plans were for a 657 work year-project, just to "distribute the data processing" in relation to the present centralised online and batch system).

As predicted, we found clear evidence that the project could be delivered in something like 100 distinct steps of useful results to the user. Mind you, that still makes 6 1/2 work-years per step as an average.

At the present state of planning, where they had sincerely tried to find evolutionary paths for development, and come up with five or ten steps at most, the politicians had simply delayed the project because of its unacceptable scale and cost. They were talking (writing, actually) about using ten years to develop the new decentralised system, and then to use it for a "lifetime" of ten years. No wonder the politicians were in doubt!

I found that this project (although much better planned in evolution and attribute goals than I find in most other places) had totally forgotten to set any concrete ambition level for costs or training needs for the user. They had calculated what they thought these would amount to, in great detail, but they had made the fundamental mistake of not even having a clear ambition to reduce costs or training needs in relation to the old system. No wonder, again, that the politicians were not impressed.

But back to the mainstream of this column - evolutionary planning attributes. I hope the following list makes you wonder how to do evolutionary planning. Intuition works reasonably well. Unfortunately the method is not taught in schools of any sort, nor is it documented in the literature.

1. Early system partial delivery (typically from 3% of project expenditure) and the early increments must include most of the real usefulness, by conscious design, not by accident.

2. Earlier successful total system delivery. The feedback and adjustment to planning and design, which characterises evolutionary planning, leads to faster completion of a system which succeeds in attaining user and management objectives.

3. Requires more design and planning "imagination". The art of finding a productive sequence of implementation steps is undeniably greater than simply throwing all functions and techniques into the same pot of stew.

4. Simplifies understanding of complex cause and effect relationships. When something goes less well than expected, then the cause is related to the last step.

5. Better management control: the ability to cut off the project in the middle (and still have some results to show for your effort), the ability to see visible results in small controllable increments (management loves this).

6. User control: early user reactions can realistically affect the future implementation steps. No more of this game of the innocent user representative "approving" the revolutionary design and then turning around when the system is implemented complaining (reasonably) that this was not what he or she was led to expect.

7. Gives you a measuring tool: for costs, human resources and results. This improves your planning ability iteratively. The early data from real increments improves your predictive capability substantially. You might have to adjust your "final-stage delivery-date" after 10% of the race is run, but that is better than having to adjust the date after 150% of the race is run.

8. Planning is spread throughout the project: no front-end delay. I normally allocate a maximum of 5% project cost for the high level "global" overview design planning, before embarking on the detailed design and planning for the first implementation step (only that first one, mind you, in detail). Not only are results delivered before the planning overhead crushes the project, but the detailed planning benefits greatly from the experience gained in early implementation stages.

9. There is time for an organisational learning process. The system can be learned in small

natural increments, often moving away from the old system while learning the new one. No gigantic training budget is necessary for the "new system" - in the case cited earlier the training budget alone was over £3 million! I felt it should have been much nearer zero.

10. Gradual ability to build up necessary database. In many systems a large and accurate, up-to-date database is a prerequisite for successful operation. It needs to be built up early (in the first months of the project) and the users must gain experience and motivation to do so. Most evolutionary projects can bring in needed data elements into the database gradually as function and quality are built in.

11. Developers are "forced" to learn to build maintainable and extendable systems. If you don't they will painfully be motivated to do so.

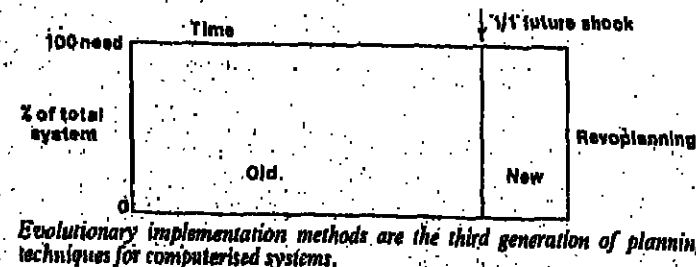
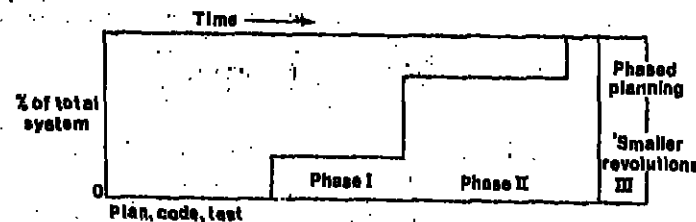
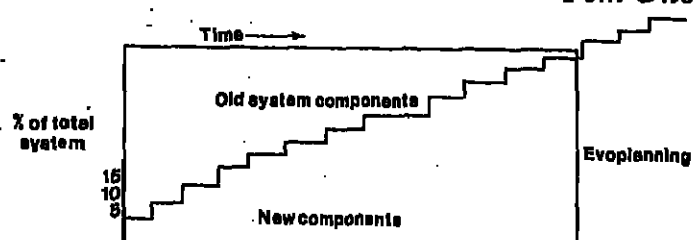


Tom Gilb is an independent consultant, lecturer and author on computing topics.

A reader from Barner, Herts, wrote recently to enquire about "a book of his (Gilb) that revealed all" on evolutionary design, which he was fairly sure I was plugging in an earlier column.

Sorry, the book isn't for sale yet! I have described the method in some detail in my new book manuscript "Technoscopes", which is presently being edited for publication by North-Holland. So, for the present, you'll just have to get it free here! But I would be most pleased to satisfy readers' curiosity or scepticism here in the column, if they would care to write with their query.

Tom Gilb



Evolutionary implementation methods are the third generation of planning techniques for computerised systems.

A question of priorities for busy DPMs

FINDING time, or making the best use of it, is probably the most vital and under-emphasised role of DP management. Relief, however, could be at hand from the NCC which later this month is staging a one-day seminar, Getting The Right Things Done.

For £112.70 those involved not only receive guidance on how to find more discretionary time, and establish key time critical areas, but also on individual memory recorders and planning systems.

Ignoring the possibility that a more structured and practical approach would have been to issue the planner at the start of the year with the event heavily underlined, it could be that many DPMs will be unable to make the seminar due to lack of time, pressure of work and over-commitment.

The course is designed for busy executives of the kind who find themselves tied-up with the trivial at the expense of devotion to the essential. Whether spending a day with the NCC in Central London automatically qualifies as an essential activity is debatable, especially as the session makes no claim to have discovered the universal solution kit.

However, should the NCC package, then indeed all directions should lead to the event. Few other areas of management compare with the responsibilities and involvement of DPMs, where there is seldom enough time, but over-abundant quantities of trouble and turmoil. Hopefully, the NCC will offer comfort and advice in the face of great adversity, provocation and harassment.

A day in the life of a DPM could begin with the news that the senior

shift operator is off sick and that the two trainee operators have defected to the better paid pastures of the local gas board installation. Further news bulletins reveal that the warehouse manager, once a staunch opponent of a computerised stock control system, now is threatening to dust-up the entire DP team unless his VDU is put back online immediately.

The inter-office memorandum channel gives notice that at some stage during the day's proceedings, the managing director will be bringing round a squad of VIPs for an installation tour, the systems progress meeting has been brought forward by one hour and the local fire brigade site inspection team will descend some time during the afternoon.

Should the DPM have time to consult his diary, he will find already listed a warning that the system will have to be closed down at some stage during the day with a critical diversion is made to the air conditioning trunking, scheduled interviews with a bank of programmer hopefuls from the field, and a heavy lunch with a keen PCM supplier.

Meanwhile, the installation switchboard is coping with a stream of calls to the DPM (on sundry stationery and media suppliers, and the company accountant who is demanding the immediate presence of the DPM on a matter of budgets and expenses).

The normal course of events often precludes the DPM from attending even a one-day seminar. But in the case of the NCC session, maybe all calls, memos and visits should be buffered for one day, until normal service is resumed.

10 YEARS AGO

From Computer Weekly of March 11, 1971...

THE long-awaited 370/135, announced this week by IBM, is of particular significance to the UK. It will be manufactured for Europe, Africa and the Near East at IBM's Havant, Hampshire, plant... Large-scale redundancies, amounting to about one-third of the professional staff, have been announced by 1900

Programming UK Ltd... Systems International (UK) Ltd has gone into voluntary liquidation as a direct result of the collapse of Rolls-Royce, which had a 40 per cent share of the company... Honeywell has introduced the Series 6000, a medium-large to large computer.

Computer Weekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, March 12, 1981

ICL and the future

BRITAIN needs a strong presence in all the main areas of the computer industry. Computer Weekly has always rejected the insistent murmur of marketing arguments which say that Britain should buy from those who seem to have better technology and better products already, rather than take on the costs and risks of building them ourselves. We continue to reject those arguments.

Being big in computers implies a big computer company to produce a big range of products from big computers downwards. For this country, that company is ICL. And today ICL is in trouble from factors which go deeper than any temporary height of interest rates or of sterling.

To be a big computer company, ICL is not big enough. It lacks the breadth of markets, the product range and the financial resources. Without them it cannot get bigger relative to the Burroughs of this world, let alone the IBMs.

Take those defects in order. ICL's acquisition of Singer's European interests in 1976 brought with it two manufacturing sites in the US and an entrée into that crucial market. But, for whatever reason, the manufacture of mainframe products like the 2903 was not transferred there, and the marketing spend needed for success was not made.

True, ICL is strong in Europe, the world's other major market. But only in France is it powerful. In West Germany the company is overshadowed by its US rivals. Elsewhere in the world Japan Inc remains a closed market and only Australia and South Africa shine.

What about the company's products? On any reckoning the 2903/4 has been a success, and the ME29 looks set fair to repeat it. ICL has sensibly dropped out of the very top end of the market, so will not attempt to match IBM's 3081, for instance. But it badly needs a competitive product range in the area addressed by the System 10, a now ageing inheritance from Singer, and it does not have a mini range to match, say Univac's or Honeywell's.

ICL is also noticeable by its absence from the office automation field, with its single product, the 7700 word processor, not a promising contender.

Operating systems to go with the mainframe products continue to cause headaches. VME/B is still not right, to such an extent that current customers continue to specify the old DME George 3. Yet IBM and Univac have had similar horrors with operating systems and managed (more or less) to straighten things out.

The speed at which ICL converts new technology into products - a key test for any computer company - can be impressive. Witness ME29. But too often its outstanding R&D successes do not result in immediately saleable products.

The other element for the big company - its financing - is the difficult one. An analysis reported on page 5 concludes that ICL may go for a rights issue to raise money from shareholders, but that to be successful this will depend on the support from the government.

Whatever the details, this question is fundamental. And the answer lies with the government.

Perhaps the company's efforts to stem cash outflow and fight back to profits will succeed without the government's intervention, or at least with only marginal support. Then doubtless shareholders will lift their sights above short-term problems and back ICL with their funds.

But by then the clarity of the company's dilemma will be lost. It is Britain's problem that ICL is not big enough. Some governments already have big computer companies (the US), some are making sure they get them (Japan), some will fight tooth and nail to build them (France), and some will keep paying to keep them alive (Germany). What about us?

1984 and all that...

THE first reader to send in this week's example of the strange things people say in the media about computers was Colin Rutter, of London, who wrote: "Each generation of electronic events come off the design board it is not just the over-40s who get left behind... Almost without our noticing, we are returning to a twilight world of primitive and primitives - where the priests, secure in their exclusive knowledge, can dominate and distort the shape of the lives of the rest of us." What inference can we draw from the fact that by 1985 a pocket calculator that costs about £1 will be faster and have more "memory" than today's most powerful computer, the Cray 1, which is worth about nine million dollars?

It is not enough to donate old hardware to your local school

I READ with sympathy the plea from Mr Bailson of Gillott's School (CW, January 15).

My own school has been using an Olivetti TE900 online to a Horizon 32K microcomputer and another four Olivetti for offline data/program preparation on to paper tape, for over 18 months. Continual breakdowns of the "donated" machines have now reduced our service to two teletypes with a frustrated teacher, screw-driver in hand, and well over 100 enthusiastic pupils joining an ever-increasing queue!

Many, especially those in "authority", would argue that schools that persist in using donated machines ask for all the trouble they get. However, such people do not tell us how or with

what we must teach the many pupils who have been awakened to this "new technology". One microterminal is a joke!

Co-operation between the industry and schools must be part of the answer. It is simply not enough to donate old equipment to your local school. You must supply manuals, circuit diagrams, etc, and even more realistic for many industries to donate, say, a couple of hours of their engineers' time per year to a school to help overcome maintenance costs.

If a donated machine will then last for, say, a couple of years before joining that great peripheral paradise then it is two years that the pupils of that school would not have had, without such generosity and co-operation.

I find it quite unacceptable that a company the size of Olivetti could not take the trouble to secure the appropriate manual for Mr Bailson. Surely they have files on past customers and records of past machines.

Only with adequate provision for computer education for all children in our schools will so many of the comments found in 1984 And All That finally disappear.

I am asking for much more from hard-pressed industries than we have had. But for a little cost and trouble the investment made in our kids must be worthwhile.

CHRIS MONK
I/C Computing Studies
Philip Morant School,
Colchester, Essex.

Training computer teachers

IT was good to read John Cookson's article (CW, February 19). His identification of teacher training as a "major problem" was unfortunately buried in the much less important issues of programming languages and school hardware. If we can get well trained teachers of computing then not only will better equipment and software appear in the schools but better use will be made of these precious facilities. It hardly needs reiterating that "programming" is not the only activity needed in schools (some would claim the least important). Thus the national initiative should be for better facilities for preparing teachers in computing as a school discipline and as an important feature of the general school curriculum.

Traditionally many LEAs have encouraged in-service training in the form of short courses, conferences and workshops. The Advisory Unit for Computer Based Education spends a great deal of its time and money on this in Hertfordshire. Despite this wonderful example, few other LEAs have even considered such an investment in their young people's future. It is therefore unlikely that the DES support of some similar activities under its £9 million microcomputer programme will bear fruit. Hopefully LEAs will not see this trend of government intervention as an excuse for not making their own commitment.

Some progress is being made. Computing has now been recognised as an area of teacher shortage and will be supported under the joint Manpower Services DES programme next year, 1981-82. A pilot one-year course is to be mounted, probably at South Bank

Polytechnic in London. The Computer Education Group has responded to its members' concern about this problem and has produced a course outline for a one-year full-time diploma or two-year part-time diploma in Computer Education (published in Computer Education No 37). Institutions throughout the country will be encouraged to provide this course. Its success will depend on its being supported by LEAs.

Two or three courses already exist. Some notable initiatives have resulted in CNAAP approved part-time courses in Polytechnic of Wales and Paisley College of Technology and Jordanhill College of Education in Scotland. A similar diploma exists at Ulster Polytechnic and is being validated by the CNAAP. This new professionalisation in teacher training for computing

should be welcomed as the natural evolution from many local initiatives which have promoted courses for teachers, e.g. courses at Preston Polytechnic (with Lancaster University), Kent University, Birmingham University, Teesside Polytechnic.

I would not wish to suppress interesting debates on programming or the suitability of computer systems for educational purposes, but we must get our priorities right. Well prepared teachers can make up for deficiencies in hardware and software but not vice-versa. The existence of a well educated body of teachers is the main requirement for progress in the use of information technology in our schools. This must be recognised by the Ministers concerned.

Professor D. E. CONWAY
Leicester Polytechnic

Teaching tools

COMPUTERVIEW does not mention the applications of speech synthesis in education. We are trying to develop software to help with the teaching of reading particularly in the remedial class and an easily programmed, versatile, and cheap speech output would increase the effectiveness of our programs enormously.

Until it can be demonstrated that microcomputers can really help in these broad and better sectors of the curriculum they will not be accepted as valid teaching tools in the primary schools of the country.

DON WALTON
Houghton County Primary School,
Huntingdon.

What about the Pope?

I WAS intrigued by your report (CW, February 26) that the Church of Scientology in the UK is seeking to have Britain's dealings with Interpol suspended until its legal status is clarified.

Is the C of S seeking the support of the Pope and the Archbishop of Canterbury?

DEREK BRADLEY
Sanderstead,
Croydon.

More letters on page 16

Effective program development means profitable data processing.

Norsk Data's interactive operating system SINTRAN was the first to be implemented on a mini-computer. It is a user-friendly system that allows many different users to work on-line with the same computer at the same time, and was designed specially to reduce the total cost of program development.

ND computer systems also include many software packages that make programming simple and efficient. And of course program development can be carried out, locally or from remote locations, concurrently with many other tasks on the same computer.



Norsk Data Ltd, Nord House, Pelican Lane, Newbury, Berkshire RG13 1NU
Telephone Newbury (0635) 31 465, Telex 849619

The competitive European Computer Company

DOWNTIME

This film will blow your mind apart!

IN one, next month when a new film called "Scanners" hits the screens, you are led to believe it is a celebration of British achievement in Computerised Axial Tomography. I print this picture as a public service. The unfortunate gentleman is not the victim of an overdose from a scanner whose tracking mechanism is stuck; but rather of a nasty person with "extraneous powers".

I am not quite sure what scans have to do with the ability to make your enemies' heads explode by remote control, but that is the explanation put about by the film's distributors, who add sweetly that the phenomenon gives the film plenty of tension.

"You never know when the next head will explode!" they say. The film is generally about what

you would expect, a doomsday plot to take over the world telepathically, and needless to say there is a computer playing a starring role. The interesting thing is that the villains (how well a minute... I mustn't assume they are villains, perhaps they are the heroes) are capable of communicating with people but also with computers.

Whether it can work both in ASCII and EBCDIC, and whether they are capable of ploughing their way through the tangled web of VME/B in search of information, is not revealed yet. I'm not sure whether I am capable of reviewing another film after the trauma of going to the porn movie Computer Game, so maybe some kind reader will let us know.



First one of Scanners' exploding heads

Red faces — or just green with envy?

AMID all the fuss over yellow telephone kiosks it is interesting to note that there has been for many years one British Telecom phone box that is not red. Who among my readers, I wonder, is knowledgeable enough to know where it is? It's an object lesson in influence in high places.

The Institution of Electrical Engineers has an imposing red brick headquarters on the Embankment near Aldwych. When a kiosk was placed outside some time in the dim and distant, it struck members that the colour clashed horribly with the red of the bricks.

Now, of course, most Post Office professional engineers and members of the IEE, so it didn't take long to pull a few strings to have the box painted green.

When the traditional design was replaced with one of those horrible modern plastic things recently, the new box was yet again painted green.

So there's a piece of useless general knowledge to impress your friends with. I wouldn't place a bet that this box will succumb to the new yellow peril.

Hope springs eternal

A CERTAIN Tory politician, whom I will not name to spare his blushes, was telling me about his forthcoming trip to the States. He said he was looking forward to going to Silicone Valley (sic) to visit Intel. He'll need a very good eye-sight to see the 950 miles to Colorado Springs.

OP SPOT

This week we take a look at salary surveys — a vital factor whether you want to limit or increase pay rates by Paul Fisher

Join the salary information 'club' — it will boost your bargaining ability

APPROXIMATELY 99% of people who turn up for work do so for the money. There are those who would dispute the figure and ask where it came from (I made it up) and they would perhaps claim that it is a distortion as it fails to account for job satisfaction, habit and so on. Nonetheless, the cliché, "I'm in it for the money", generally holds true... for some 99% of the working population.

And a statistic is born. There are undeniable problems in the gathering and the presentation of statistics, but both manage-

ment and workers rely on them in the continuing jostle over salaries. The more you know about what other people earn (and the surer you are of that knowledge), the stronger your bargaining position. It's as simple as that, and remains the case whether you want to limit pay rises or to increase them.

One of the most exhaustive studies on DP salaries is published twice yearly, in May and November, by Computer Economics (CEL) of Kingston, Surrey. The detailed results never become widely known because they are issued only to paying participants.

The surveys are described by CEL as a "service to management" and I was given a copy on condition that nothing would be reprinted without permission. Copies are not put on sale and a trade union, for instance, would have difficulty in obtaining one.

Some participating companies show survey results to their employees, others do not.

Installations employing up to 25 people pay an annual fee of £162 to join the "salary information club". Installations with more than 176

employees pay £380. For that they receive six monthly reports with contents including a breakdown of DP salaries in terms of a distribution showing minimum, lower quartile, median, upper quartile, upper octile, maximum and average and the size of the sample using basic annual salary and total annual earnings; percentage changes of earnings over six and 12 months; labour turnover; earnings analysis against experience and age.

The jargon word quartile refers to a point in an ascending tabulation of salaries at which, in the case of the lower quartile, exactly a quarter of the salaries are lower. The upper octile is the point at which 87.5% of the salaries are lower. The median salary figure is the one where half the salaries are higher and half lower. Quartiles, octiles and medians give a truer generalisation of salary scales than does an average figure.

Figures are often misleading — you have to know in the first place what you are asking for. Your average Martian wanting to land his spaceship might ask for the average height of the world's mountains. Your average statistician would be able to give an answer. He could give a median figure too, but it wouldn't help the Martian attempting a first landing on the top of Everest.

Similarly with salary statistics, even when what is wanted is precisely known, it is difficult to move from the general to the particular. CEL's figures are arrived at by personnel departments filling in a form which is subsequently processed on a bureau 370/145. For first-time participants the form-filling is obviously a lengthy process. However, once the information is lodged in CEL's database, the next form to be filled comprises a printout of the previous form for a six-month update.

CEL is at pains to stress that data is secure saying: "The output is designed to prevent any company being identified with any particular detail of information." The input is coded.

Last November's survey covered 572 installations with 36,661 individuals on a database which was over 93% constant. The graph shows what has happened to operations total annual earnings

according to the results of CEL's last ten surveys.

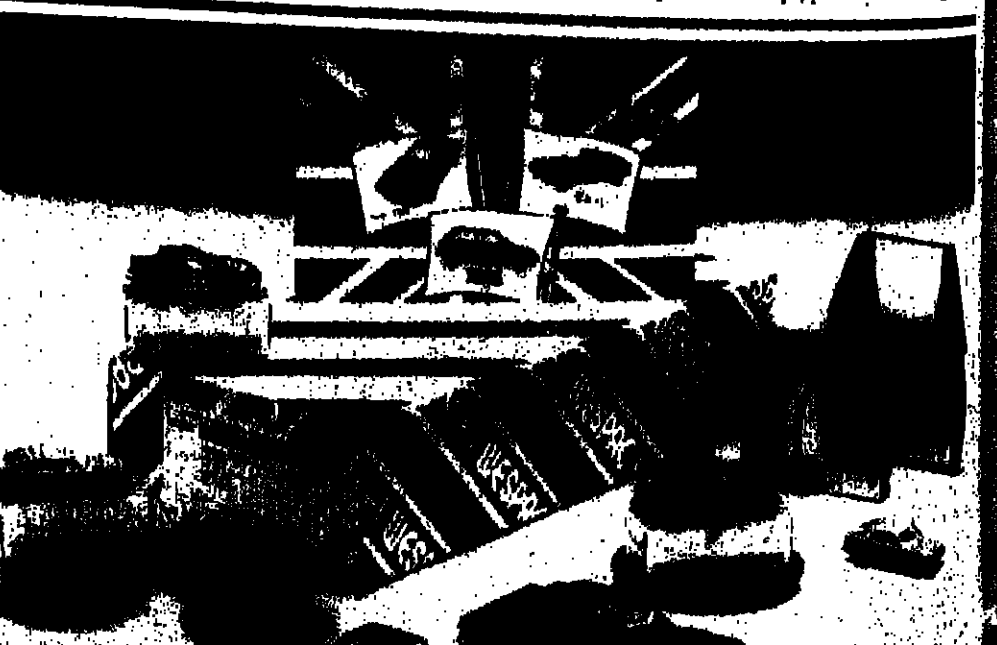
Since the beginning of the year Op Spot has quoted three figures as being an average or median UK operators' salary (with all the extras). As Robert Grant, editorial director of Computer Users Year Book, pointed out to me: "It is important that the pertinent facts are revealed when salary surveys are compared. Although bigger does not necessarily mean better, it seems to me that your readers would be better served if the pertinent facts were revealed so that they could judge the credibility and value of a particular survey."

Anyway, the figures with sample size and source are shown in Table 1. All have been gathered in the past year and, to the best of my knowledge, were gathered in good faith. They are certainly worth repeating.

Of the three sets of statistics, when seen in total, CEL's appear to be the most thorough. It is a shame, from non-management's point of view, that CEL's method of collecting its data restricts access. The results represent a powerful (and it has to be admitted inflationary) bargaining device.

Figures, like facts, should be approached with caution and cynicism — but they are often all there is to cling to.

This is a man to count on — he may be counting you. Peter Stevens, control computer economics compiling six-monthly DP salary surveys. His mingling of salary statistics on more than 35,000 mainframe computer people made him something of an authority on matters concerning ops. His recent CEL's findings on labour turnover, overtime and shift working plus evolution of job categories will be featured in Op Spot over the coming weeks.



Wespac's wacky Best of British gift for buyers of its ribbons.

Getting patriotism taped

THE Charter and DI sale has begun and much cash will change hands. Since the breweries, flag-makers, food chains and china companies have already risen in anticipation of a flurry of patriotic purchases.

The royal father used to travel the land urging us to buy British, and the type surrounding the royal wedding (and some people are actually enjoying it) has been to that end or not. Negatives in this should not be confused with patriotism and nationalism.

A distinction should be made at this point, one which is well valid for tri-chumpers and some people are actually enjoying it, but we have at least a touch of patriotism.

The toy cars, too, come from a British-owned company, Matty Playcraft, although some of its manufacturing is contracted to Hong Kong.

Back to Wespac, because it plugs the British bit further by saying: "The Wespac ribbon reconditioning service serves the UK thousands of pounds each year by refurbishing used ribbons for government departments, public utilities and a vast range of commercial and industrial concerns."

PEOPLE

Computer firms at Premier's reception

REPRESENTATIVES of the computer and related industries were offered encouragement from the government in the shape of a reception held at 10 Downing Street recently.

Managers and employees from 36 of Britain's most successful small and medium-sized companies attended the Government's Reception for Enterprise, and guests included CTL, Xionics, Remek Automation, ICS, and Communication Studies and Planning.

Recommendations for attendance at the reception were made by regional Department of Industry offices, and there were about 150 guests.

Government representatives included the Industry Secretary Sir Keith Joseph and Secretary of State for Employment John Biffen.

The reception was the first where both heads of companies and employees were invited to attend. The object was to encourage a dialogue between government and small and medium-sized companies.

Those on the guest list were "the more successful companies who have shown an innovative spirit and entrepreneurial skill", according to a Downing Street spokesman.



At the Government's Reception for Enterprise, left to right: Kenneth Baker MP Minister of State, Sir Keith Joseph of Xionics and Tony Davies of CTL.

BCS postpones symposium

INSUFFICIENT registrations have led to the postponement of Computing for National Development, a symposium arranged by the BCS Specialist Group for Developing Countries, which was scheduled for March 23-27.

Bibliographies prepared for the main themes of the use of computing in agriculture, transportation, water management and finance will be published with a compendium of the major papers.

The BCS plans to incorporate the concepts of the Symposium into the activities planned for the 25th anniversary of the founding of the Society. Any queries should be directed to Ian Shearer, 13 Mansfield Street, London W1M 0BP. Tel: 01-992 2860.

ance will be published with a compendium of the major papers.

The BCS plans to incorporate the concepts of the Symposium into the activities planned for the 25th anniversary of the founding of the Society. Any queries should be directed to Ian Shearer, 13 Mansfield Street, London W1M 0BP. Tel: 01-992 2860.

Ken Ramsay has been appointed applications product marketing manager at the business computer division of CTL. He was previously systems development manager with Tymshare.

Derek Jennings has moved from systems and programming manager to general manager at Sirius B Computer Systems. He joined the company in 1977.

Ron Beadle has joined Vaughan Systems and Programming as system specialist. He was formerly concerned with flight information systems at the British Airports Authority.

Robert Hallam and Peter Darby have been appointed directors at Feni Data Services. Hallam becomes operations director. He has been with the company for eight years, the past five as operations manager. Darby is financial director and joins Feni from within the Sunlight Service Group, of which Feni is a member. He served the group most recently as group financial accountant.

John Douglas has been appointed support consultant at Computer Automation. Before joining the company he spent 12 years with Lucas as systems manager for Gilling parts and service.

DIARY

- MARCH 14** Finals of school management game, BCS Belfast. ICS Computing, Belfast. Sponsored by Ulster Bank.
- MARCH 17** Meeting, Wang VS Users Group, Nestle, 81 Georges House, Croydon. Details (0202) 29111 ext 201.
- MARCH 18** Why the DPM needs standards and how. IDPM, Pearl and Dean Studio, 15 Broadwick Street, London. 6.00.
- MARCH 19** CMC 3000 Series Sub Group meeting, CAA, Aviation House, Holborn. 10.00.
- MARCH 24-27** Computer Ireland, SIDL Exhibitions, Leopardstown Exhibition Centre, Dublin.
- MARCH 25** CMC Reality Sub Group meeting, Gestner Ltd, Buxton Road, London. 10.00.
- MARCH 25-26** Data logging teach-in, MC Computers Ltd, MC Computers, Newbury Engineering Facilities, Details from Steve Metcalfe on (0635) 44967. 10.00.
- APRIL 7** Meeting, Gino Users Group, Computer Centre, Mathematics Building, Bristol University, 10.15.
- APRIL 9** Meeting, IBM Guide Set Group, IBM, Basinghall Street, London EC2. Details Alan Peck, tel: 01-828 8104.
- APRIL 14-16** Second London Computer Fair, Association of London Computer Clubs, North London Polytechnic, Details 01-607 2789.
- APRIL 18** Experience with new database products, BSC Database Specialist Group, Room G6, New Engineering Block, University College London. 200.
- MAY 20** Has the operation team a future? IDPM, Pearl and Dean Studio, 15 Broadwick Street, London.
- JUNE 1-3** Conference, Datamanager User Group, Copenhagen. Details 01-486 3947.
- JUNE 17** Database design, IDPM, Pearl and Dean Studio, 15 Broadwick Street, London.

CONFERENCES

Compatibility with IBM's SNA is the theme of a seminar and workshop to be held at the Churchill Hotel, London, from March 17-20. It is organised by the Californian firm Telecom Computers Technology (TCT). The event sets out to achieve a user oriented assessment of how IBM compatible devices and networks may be used in the SNA environment. Rumpus will be on providing a safe route into SNA to yield improved performance and reliability. For further information contact: Peter Wink or Annie Gregory on 01-948 3111.

Many engineering techniques now depend on computers. The high speed numerical engineer uses the computer as a tool to calculate stress and displacement caused by loading, while the manufacturing engineer uses it as a controller. Microcomputers and microprocessors are predicted to have an even greater impact on engineering design and techniques of the future.

Whether you're buying your first computer or moving up, you shouldn't have to settle for a general-purpose answer. With Wang, you don't. From our 2200-series of small business computers to our powerful VS computer family, every Wang system is designed to be specifically tailored — in hardware and software — to do exactly what you need done. From simple bookkeeping to large-scale data processing. And no matter which Wang system you start with, you can expand easily and affordably, from the smallest to the largest model in the line. And full software compatibility within each product family protects your software investment. So instead of settling for a computer that's just right for

Restructure at Philips

PLANS to bring Philips under a central management system — which led to the formation of Philips Business Systems last year — have been taken a stage further with the reorganisation of the Business Systems Group's low-end business computer marketing and distribution activities.

The Group's Office Computer Systems operation (OCS), has been merged with the Business Equipment division where Geoff Hoddinott, former divisional director of the Small Business Computer division, has been appointed deputy director. Director of the OCS/Business Equipment merger will be Reg Parry.

Burfi ap Gwilym, former commercial manager of the Small Business Computer division, is now general manager responsible for the direct sales activities of OCS.

The Small Business Computer operation (SBC) has become part of the Data Processing division. Peter Cox, previously regional manager of SBC becomes general manager, reporting to Tony Nevison.

David Cliffe, former computer sales executive at Ventek has been promoted to product manager.

Eleanor Hoh has joined Metrotech Management Technology as marketing support representative. She was formerly with ICL.

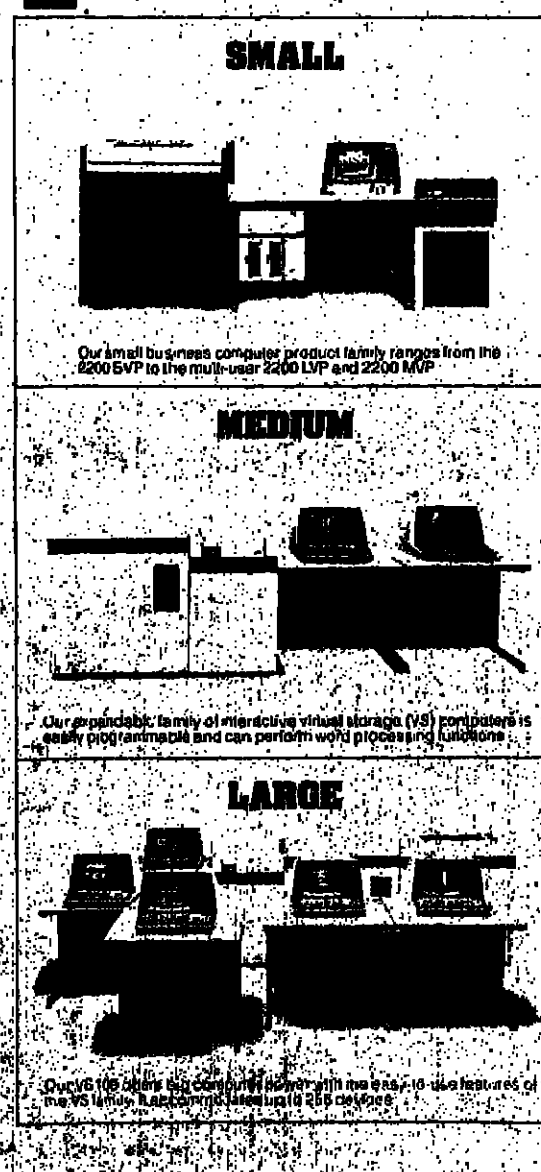
DP industry keeps in trim

NEVER let it be said that computer users are an unfit bunch. Computastars has its highest number of entries for three years this year, and the organiser of the Wright Line Squash Tournament, the Carter-Parratt Group, reports a "staggering" 512 team entries for this year's competition.

The tournament teams consist of employees of data processing or accounts departments, including one team member of managerial status. Entries from all over the UK have been divided into 12 regions. The finals will be played in January next year.

The next round is to be played at the Hiltcraft Squash Club in Wallingford, Oxford between County Computer and MC Computers Ltd at 10.30 a.m. on March 14.

Every computer Wang sells is a perfect fit.



everybody, call Wang. And get a computer that's just right for you.

Wang (UK) Limited, Wang House, 100 George Street, London, W1, United Kingdom. Tel: (01) 486-0200.

I'm interested in a fitting. Tell me more.

Name _____

Title _____

Organisation _____

Address _____

Telephone _____

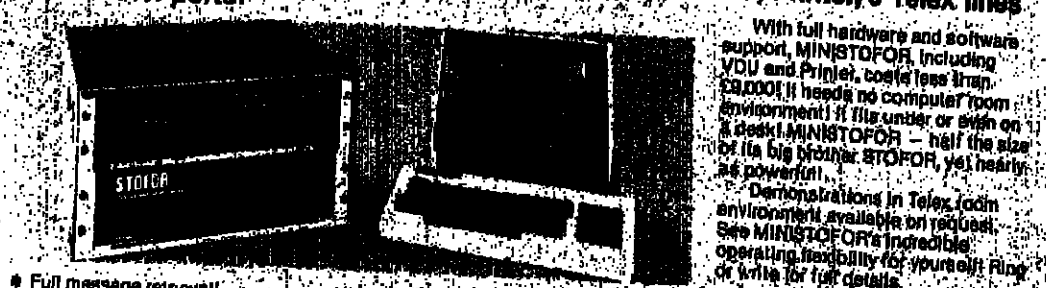
Send to: Wang (UK) Limited, Wang House, 100 George Street, London W1, United Kingdom.

WANG

Making the world more productive.

You've heard of Stofor. Now meet its baby brother - Ministofor!

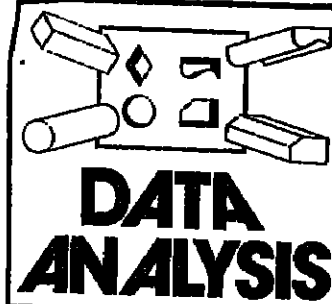
All the features of its big brother — Telex, Message Switching, Time and Cost Cutting — and all for less than £9,000 installed, inc. VDU, Printer, 3 Telex lines and 2 other ports!



- Full message retrieval
- Holds up to 2000 Telex addresses in memory
- Holds a large message library
- Individual or Group addressing
- PLUS Telex Switching!
- Cuts transmission times
- Gives instant Telex cost analyses for instant action
- Wide Telex feature standards
- Ministofor will dial out to
- mixed telexes
- Time pre-allocated batch transmission
- Three priorities available
- Queue interrogation and hold feature
- Full traffic statistics provided

MINISTOFOR will CUT your operating costs, make your Telex more efficient, and cater for all Telex user needs.

Fenwood Designs Ltd, 111, Lane, Godalming, Surrey GU7 1EX. Telephone (0488) 655. Telex 555555 FENWOOD.



Mapping results into a system design

Section II - Part I

of our series describing a system design methodology

by Rosemary Rock-Evans

This week we begin the second, shorter section of our series. The emphasis has been on analysis, because this is a neglected art; the remaining seven parts are about design and have deliberately been made broader in scope.

TO consider all aspects of application design could take a series of its own. This one article will concentrate on the aspects which involve mapping the results of functional analysis into a system design.

The analysis stages produced several outputs: function hierarchies and a function network; an entity model (and accompanying forms); a data flow diagram for each level in each function hierarchy; entity life cycles and matrices; functional models and access path analysis forms.

The design phase involves two main tasks: database design and application design.

Database design uses the entity model and access path forms, attribute forms, etc. and will be discussed in the next article.

Application design uses the function networks, data flow diagrams and entity life cycle matrices.

In the article on function networks, it was shown that each level in the network could be translated into a data flow diagram, which represented the area under study. There are three steps to transforming this generalised picture into a picture which defines a proposed computer system, two of which occur in the early stages of a project.

Firstly, the data flow diagram which provides the necessary level of detail is chosen and the domain of change is shown. The domain of change is the area which will be affected by the change in the existing system. It will thus include areas which will not necessarily be computerised. This area is chosen by the user. It may already have been specified in the terms of reference, but in many cases the area is not precisely defined and the data flow diagram can be used to fix the boundary in a more positive way. This is shown in Figure 1.

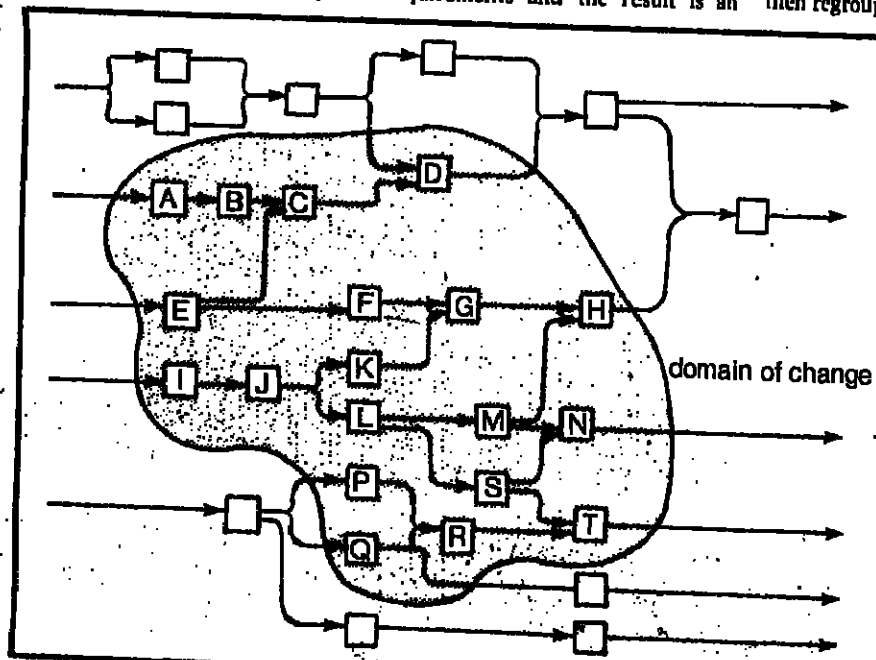


Figure 1. Establishing the domain of change using data flow diagrams.

application development strategy, broadly defining the area of computerisation.

The area of computerisation can be shown as a data flow diagram (see example, Figure 2). This was the stage reached in the article on function networks when the systems boundary was drawn.

A level in the function hierarchy is chosen so that a computerised function contains no non-computerised functions and a non-computerised function contains no computerised functions.

In Figure 3, the simple household management example has been used to show this level. This may be termed the first level of mechanisation.

The functions at this level are then regrouped into computer and non-computer functions.

It may not at first be obvious why this is necessary, but an examination of the household management example will show why.

In Figure 4, the function hierarchy has been expanded to include an extra function: 'providing accommodation'. As can be seen, at the bottom level a common function occurs: 'boil water'.

If a data flow diagram had been drawn at this level in the hierarchy, it would have had the appearance in Figure 4. The computerisation of the 'make tea' function, however may only have affected the 'boil water' function within the 'make tea' hierarchy.

The 'boil water' function in the 'providing beds' hierarchy may be done quite differently. Thus circling the area of computerisation at this level produces completely the wrong effect, as it passes the constraint that everything we want to 'boil water' has to be done via the robot.

Thus the solution has to be to regroup the function hierarchy into computer and non-computer areas, and redraw the data flow diagrams to show the regrouping into the higher-level system function has been made. This is what is shown in Figure 2.

The Third Stage occurs the detailed analysis, and establishes the scope of the design phase. The functions are examined in much greater detail and the following steps completed:

● The possible mechanisms capable of supporting the functions are identified (mechanisms are defined later in this article).

● The frequency of functions is quantified.

● The functions are filtered, based on the costs of the mechanisms, the frequency, costs of conversion, and so on.

The result is a business system specification which provides the cost and benefit of various solutions based on the results of filtering the functions.

Once a solution has been chosen by the user, the data flow diagrams can again be redrawn (for the reasons specified in the last section) and the actual areas of computerisation can be shown as a data flow diagram with the inputs and outputs required clearly specified and the areas outside the system shown to indicate the impact on the user area.

Both the second and third stages in application design involve deciding the mechanisms by which the functions are to be implemented.

The second stage described which functions were to be computerised and which were not, and the third stage described these

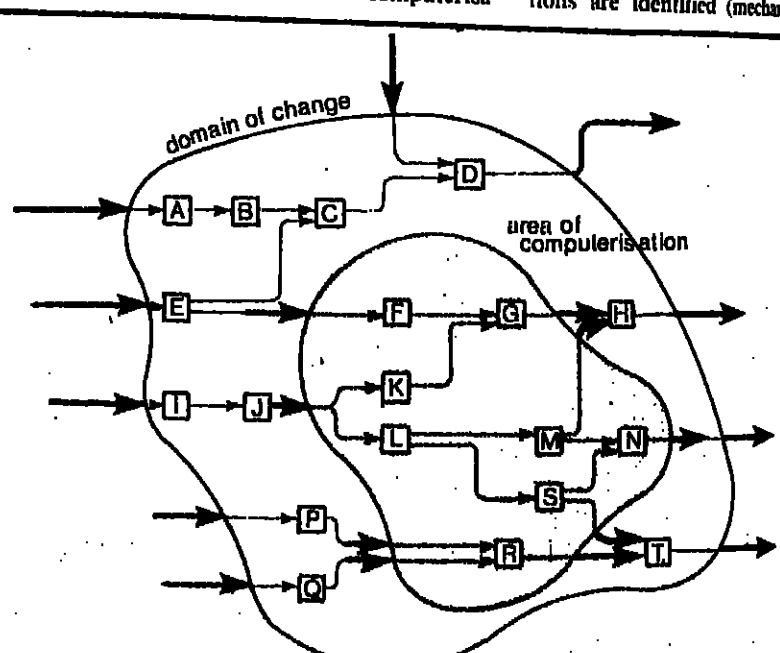


Figure 2.

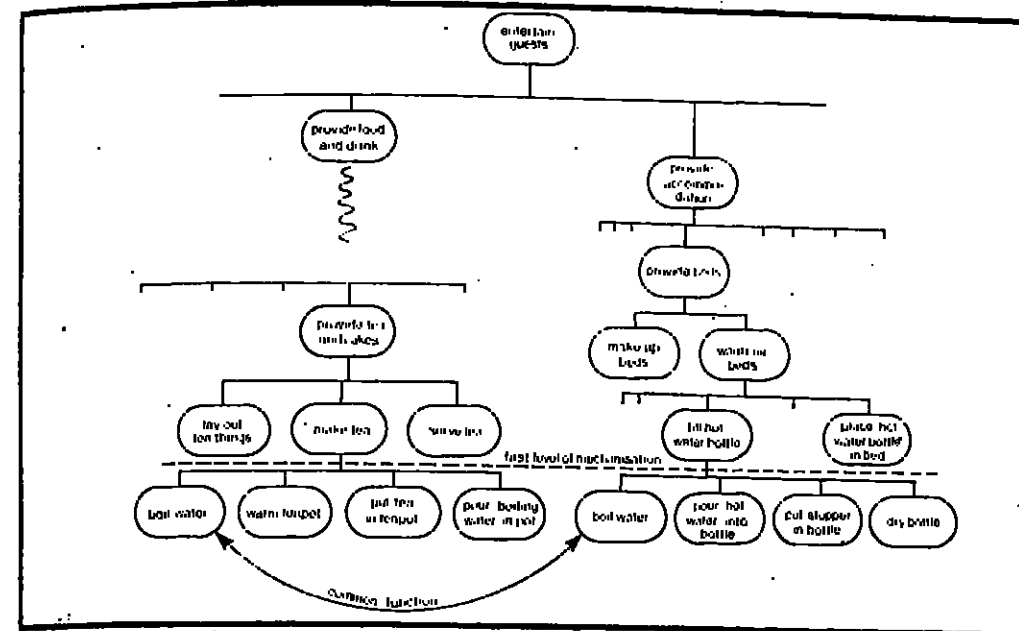


Figure 3. The household management function hierarchies showing a common function 'boil water'.

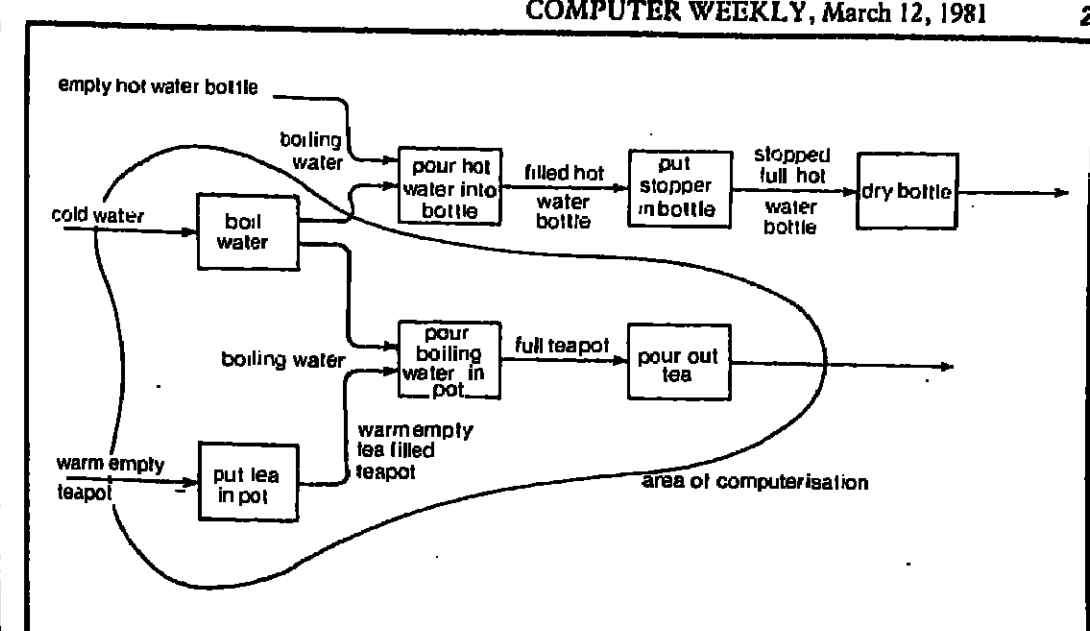


Figure 4. Effect of establishing area of computerisation around common function 'boil water'.

All the information for application design

are defined later in this article).

● The frequency of functions is quantified.

● The functions are filtered, based on the costs of the mechanisms, the frequency, costs of conversion, and so on.

The result is a business system specification which provides the cost and benefit of various solutions based on the results of filtering the functions.

Once a solution has been chosen by the user, the data flow diagrams can again be redrawn (for the reasons specified in the last section) and the actual areas of computerisation can be shown as a data flow diagram with the inputs and outputs required clearly specified and the areas outside the system shown to indicate the impact on the user area.

Both the second and third stages in application design involve deciding the mechanisms by which the functions are to be implemented.

The second stage described which functions were to be computerised and which were not, and the third stage described these

mechanisms in more detail.

It may be remembered that a function was defined as what the business did, but with no mention of who performed the function, what form the input and output took, e.g. the forms or documents which could be used, how the tasks should be implemented, or whether it should be performed clerically or manually, computerised or done by machine.

A mechanism is the means by which a function is implemented. It takes into account both the 'how' aspect of implementation

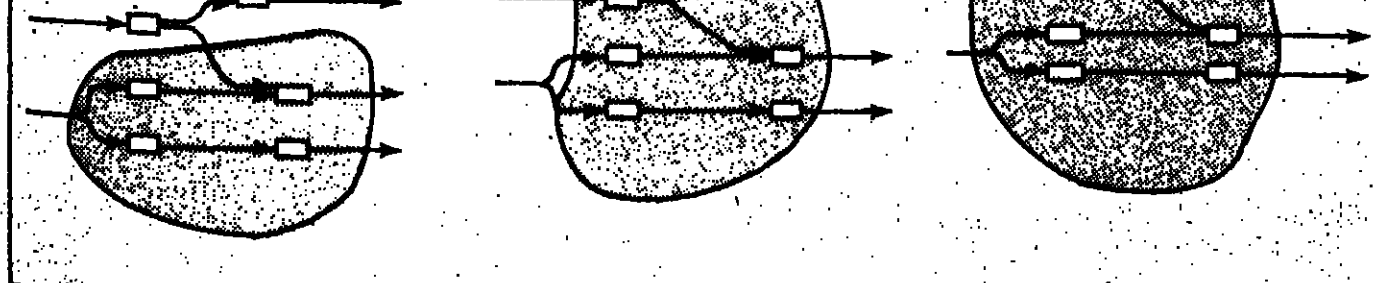
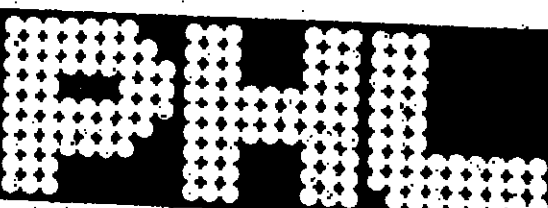


Figure 5. Comparison of different systems.

Implementation of input/output or function?	Symbol	Description	Implementation of input/output or function?	Symbol	Description
Output		computer produced document or report	Function		keypunch machine operation, e.g. using keypunch, verifier, etc.
Input (or Output)		punched card or cards	Function		other machine operation, e.g. using calculator, etc.
Input/Output		paper tape	Function		clerical/manual (FROM D & M)
Input/Output		magnetic tape	Output/Input		document, form
Output		VDU display	Function		teletype operation
Input		online keyboard or inquiry station	Function		transfer or transfer operation (not by machine)
Input/Output		console	Function		teletype operation
Input/Output		direct access magnetic storage e.g. disc, drum	Function		teletype operation
Input		machine-readable document, e.g. OCR	Input/Output		teletype operation
Input/Output		communications link for data transmission	Function		teletype operation
Function		computer process type of computer can be specified, e.g. macro and weather online, batch or real time process	Function		teletype operation

Figure 6. Symbols used to represent computer mechanisms.

Figure 7. Symbols used to represent non-computer mechanisms.



...when you need a dependable supplier, an authorised distributor with a comprehensive range of products at keen prices, backed by large stocks for fast delivery, with full after-sales support. We promise you a rapid response.

ANADIX DP8000
Exceptional value and high reliability. 80 lines per minute, 112 cps. Parallel and serial interfaces as standard. 96 ASCII set, 9 x 7 font. Variable tractor. Forms handling facilities. 1K buffer store. Optional: 4K extra store IEEE interface.
from only **£494**

DIGITAL LA34
30 cps dot matrix terminal. Full lead, paper widths from 3-14 inches. 128 ASCII character set. 7 x 9 dot matrix. Options include a 20mA interface, function to accept pre-printed lead paper and numeric keypad.
from only **£566**

DIGITAL LA120
120 cps keyboard terminal. Optimised for line printing. Selectable character set. 128 ASCII character set. 7 x 9 dot matrix. Options include a 20mA interface, function to accept pre-printed lead paper and numeric keypad. All international and foreign sets.
from only **£1556**

LEAR SIEGLER ADM-3A
The most complete visual display in the world. 1600 character screen capacity. Cursor addressing. Dual interface. Assembly part. Wide range of speed and word counts. Options include Teletype, 20mA interface and numeric keypad.
from only **£450**

GRAPHICS TERMINAL
A low cost option to the ADM-3A. Powerful graphics capability. A 20mA interface. 1600 character screen capacity. 812 x 250 dot matrix. 7 x 9 dot matrix. Options include Teletype, 20mA interface and numeric keypad.
from only **£1200**

LEAR SIEGLER ADM-42
Low cost VDU with two page display and full editing features. Dual interface. 80-200 baud data rates. Upper/lower case character set. Cursor addressing, editing, protected fields, dual interface. Optional pointing and addressing, printer port.
from only **£795**

LEAR SIEGLER ADM-42
Low cost VDU with two page display and full editing features. Dual interface. 80-200 baud data rates. Upper/lower case character set. Cursor addressing, editing, protected fields, dual interface. Optional pointing and addressing, printer port.
from only **£795**

TYPEWRITER TERMINAL
Two machines for the price of one. Type writer style function for single documents, letters etc. Pin feed for continuous business stationery. Electric typewriter keyboard and layout. Left and right hand margin setting. Clear, high quality printout.
from only **£1049**

TECHTRAN 980
High speed, high quality terminal and intelligent data collection. Microprocessor control. 2000 character storage per line. 1024 character screen. Switch selectable mode. 812 x 250 dot matrix. 7 x 9 dot matrix. Options include Teletype, 20mA interface and numeric keypad. All international and foreign sets.
from only **£799**

TEXAS 810
Compact 120 cps 132 column printer. Optimised for dot matrix printing. 812 x 250 dot matrix. 7 x 9 dot matrix. Options include Teletype, 20mA interface and numeric keypad. All international and foreign sets.
from only **£850**

TELETYPE 43
Versatile, economic and reliable. 30 cps, serial interface keyboard printer. 132 or 80 columns. 94 ASCII set. 9 x 7 font. Clear, high quality printout. Microprocessor controlled. Portable versions. Character set options. Call today for more details or a demonstration.
from only **£695**

PERIPHERAL HARDWARE LIMITED
Amfield Close West Molesey Surrey KT8 0EA. Tel: 0221 04

SOUTH
01 941 4806

NORTH
Harrington 501263/4

IRELAND
Dublin 952316

Wilkes Computing
for
DEC SYSTEMS
VAX[®] 11/780
PDP[®] 11/70, 11/34's,
11/44's
PDP[®] 11/03, 11/23's
systems and
software
VT[®] 100 LA 120
LA 34
Home and
Export Sales

© Digital Equipment Company Ltd.

Wilkes Computing

Tel: (0272) 25921 Telex: 449205

Japanese 'invasion' gives the US a bad case of nerves

THE American business community is looking fearfully over its shoulder. Japanese manufacturers are hot on their heels in yet another industry that Americans once considered their own: computers.

By most accounts, 1980 was a successful year for the Japanese computer industry. For the first time, a Japanese computer manufacturer, Fujitsu, outsold IBM Japan, the wholly-owned subsidiary of the American industry leader. Fujitsu also inked an agreement with TRW Corp, an American conglomerate, to establish a \$100 million joint venture that will sell Japanese data processing hardware in the US.

Nor was Fujitsu the only Japanese challenger of US supremacy. Both Hitachi and Nippon Electric Company (NEC), two of Fujitsu's competitors at home, unveiled machines comparable in performance to IBM's latest big computer, the 3081.

In less than 15 years, the Japanese have created a competitive \$4.5 billion industry with four mainframe manufacturers: Fujitsu, Hitachi, NEC and Mitsubishi. In addition, Japan has some 300 other computer manufacturers, which make everything from peripherals for the OBM markets to stand-alone small business systems.

Starting later and smaller than any advanced European nation, Japan's computer market is now the world's second largest, exceeded in size and vitality only by that of the US.

All of this has Americans worried. Concern over the Japanese competition has become a staple of virtually any discussion of the future of the American computer business - if not the fate of all American industry. It is difficult to separate what is real from what may simply be a bad case of nerves.

Depending on who is talking, Japan, either possesses faultless business acumen or, alternatively, has by some means exposed all the shortcomings of the US economy.

While American labour is called to task for stagnant productivity

and rising costs, Japanese workers are being lauded for co-operation on the assembly line and understanding conduct at the bargaining table. While American semiconductor manufacturers suffer sharp criticism for their high defect rates, their Japanese counterparts are praised by customers in the US for the consistent reliability of their semiconductor chips.

No typical discussion of the Japanese computer phenomenon is ever complete without a citation of the role played by the Japanese government, with its research subsidies and protective tariffs.

By 1990 the Japanese will have a share of the American computer market comparable to the 20 per cent they now have in automobiles.

The US, by contrast, is said to have an ill-focused industrial programme, discouraging tax policies and cumbersome regulations - plus the US v IBM anti-trust suit.

As Charles Sporck, president of National Semiconductor Corp, has said, "It is almost incomprehensible that IBM, which is probably the nation's most important industrial asset, is under attack by the US government for being too successful. Can you imagine the same action being taken in Japan?"

IBM, for its part, does not raise any opportunity to use the threat of Japanese competition for its own purposes. At the anti-trust trial in New York, where the US Department of Justice is suing to divide the company into several smaller businesses, IBM produced as a witness Henry Rosovsky, dean of the faculty at Harvard and an expert on the Japanese economy. Rosovsky told the court that by

1990 the Japanese would gain a share of the American computer market comparable to the 20 per cent they now have in automobiles.

If Rosovsky's prediction comes true, Japan will have captured a market share as large as that now held by all of IBM's mainframe rivals combined.

By itself, Rosovsky's forecast might be subject to criticism. While IBM thought the Harvard dean's testimony was worth a fee of \$13,000 to \$14,000, the academic conceded during examination that he had never made a careful study of trends in the data processing industry.

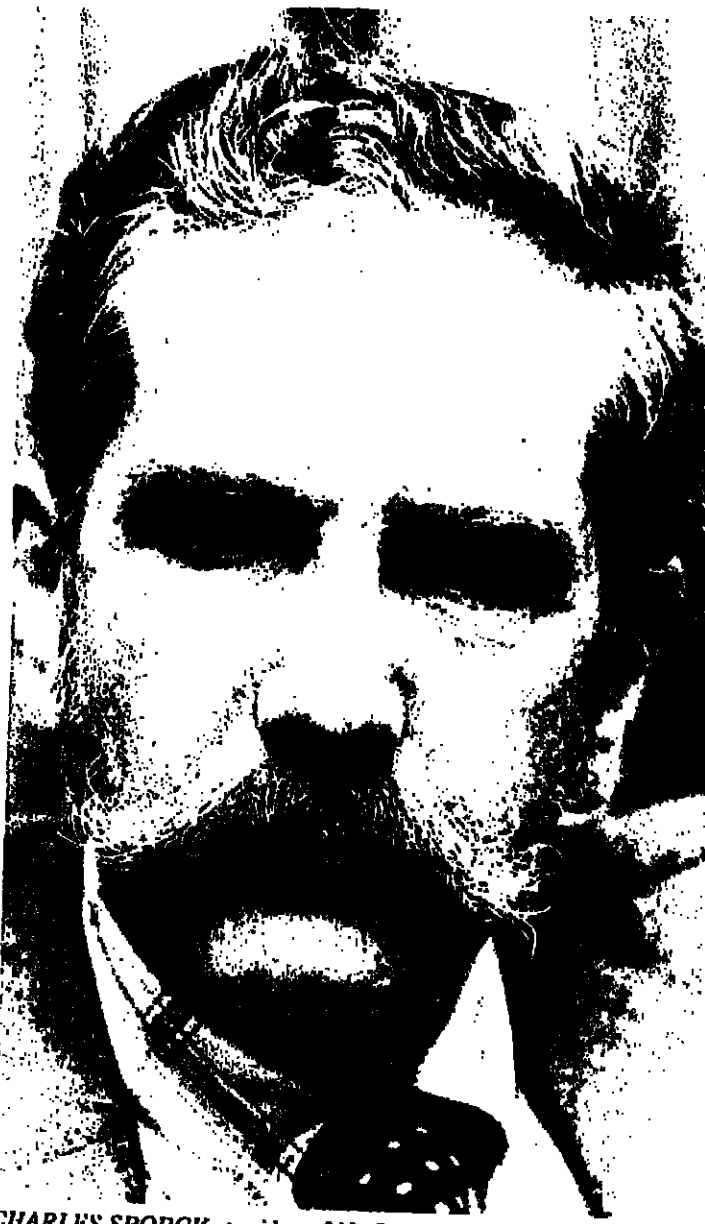
Rosovsky, however, is hardly alone in his opinion.

For more than ten years, there have been authoritative warnings about the coming Japanese computer challenge, though these predictions have not all panned out. For example, in 1970 the National Research Council sponsored a study which concluded that Japan would reach parity with the US in software development by 1975. Today, most observers on both sides of the Pacific agree that the Japanese are still five to ten years behind in software.

The difficulty in obtaining a clear picture of the Japanese computer challenge is compounded by the sometimes confusing actions of the American business community. On one hand, IBM executives express concern over Japanese competition, while on the other they agree to market large numbers of Minolta copiers, providing yet another distribution channel for imported office equipment.

Simon Ramo, chairman of the board of the TRW-Fujitsu joint venture, has written a book, America's Technology Slip, diagnosing America's decline and offering some homegrown cures. At the same time, his company hopes to improve its data processing business by giving the Japanese more clout in the US.

In case after case, whether reasoned or opined, the myth of the terrible Japanese challenge is promoted by American computer



CHARLES SPORCK, president of National Semiconductor Corp. "It is almost incomprehensible that IBM, which is probably the nation's most important industrial asset, is under attack by the US government for being too successful. Can you imagine the same action being taken in Japan?"

industry executives... at least in public. But Ulrich Weil, computer industry analyst at Morgan Stanley, the stockbrokers, is not sure how seriously these same executives take their own public statements.

When asked whether the US computer industry will lobby in favour of some kind of government help once the Reagan administration gets settled down in Washington, Weil said he "doesn't think (the industry top brass) will make the case that strongly. For public relations reasons they might. But privately, they all say 'We can handle it, and if we can't, it's our own fault'."

This veiled optimism is due in part to the slowing growth of the

Japanese computer industry. In the early 1970's, Japan's data processing business had a robust 25 per cent annual growth rate; today it is 15 per cent.

Further, in order to attain the economies of large-scale production that enable them to become competitive exporters of computer gear, the Japanese computer makers need to control their domestic markets. So far, they have not done this.

Fujitsu may have passed IBM Japan in sales this year, but just barely: \$1.55 billion for Fujitsu to \$1.54 billion for IBM Japan. And these numbers include Fujitsu's sales worldwide, while the revenues of IBM Japan are derived substantially from sales in that nation alone. IBM Japan's 1979 profits were nearly three times the earnings of Fujitsu for its fiscal year ended March 31, 1980.

In numbers of computers, IBM Japan is the leader, accounting for as much as 31 per cent of the 45,000 machines in Japan. Sperry Univac, NCR, Burroughs and other American vendors are estimated to control, together, another 14 per cent of the market.

Japan is the only foreign country where American manufacturers have less than half the local data processing business. This is testimony less to the strength of the Japanese companies than to the fiercely protectionist policies adopted by the nation's government. IBM Japan, which operates on a licence renewable every five years, is said to have agreed not to let its share of the market push the total foreign share above 50 per cent.

That may now be changing in light of both reduced tariffs on the part of the Japanese and plans by NCR, Burroughs and Data General to take advantage of the relaxed rules by expanding their production.

In spite of tariff barriers, IBM Japan has successfully kept the native manufacturers off balance in the same way that it has managed to stay on top of the American market. After IBM's introduction of the 370 series in the early 1970s, the Japanese manufacturers, supported by government research

subsidies, fought back. Japan produced good machines, but they were not good enough to withstand the market tremors that came in the late Seventies. That was when IBM introduced the powerful 303X line and the small-medium-size 4300 series. They were also price cuts on IBM's older models.

The announcements threw the Japanese market into turmoil, putting domestic companies against each other in an orgy of competitive price cutting and forcing them to introduce new models before the product cycles on their older machines had run their course.

A shakeout followed. Two of the Japanese manufacturers, Ono Electric and Toshiba, abandoned their lines. Only Fujitsu and Hitachi were able to muddle through and come out with any kind of profit.

The topsy-turvy market in Japan was a mirror image of the unsettled conditions that greeted the Japanese companies making their first tentative forays into the American market, which was also reeling from the 4300s.

The Japanese reputation for good business judgment was tarnished by the spectacle of Hitachi signing with America's Intel to market large-scale machines from Japan. Just a few months after the deal was struck, Intel was faced with the aggressive pricing of the 8085 series and its own business practices. Intel's 1979 losses, in the neighbourhood of \$40 million, gave Hitachi an intimate connection into one of the most notable business disasters of recent times. (Hitachi is still building computers for the US market and selling them through National Semiconductor, formerly Intel's other computer supplier, which was left holding the bag when Intel fell apart.)

To date, the number of big computers sold in the US that were made in Japan or made using high percentage of Japanese parts is small to the point of being insignificant. According to International Data Corp the total is fewer than 300. More than 4,000 machines of comparable size have been sold by IBM.

Two other Japanese companies, NEC and Mitsubishi, sidestepped the market for large machines, confining their American activities to the small business system market. They established wholly

Most observers on both sides of the Atlantic agree that the Japanese are still five to ten years behind the US in software.

owned subsidiaries that sell their products through networks of equipment dealers, but remain vendors nevertheless.

"The Japanese are still groping for an export strategy," says William Rapp, an investment banker who follows the Japanese market closely. "They are trying to get up different channels of distribution in this country. The fact is, they show no sign of abandoning their national goal of increasing exports by nearly a third each year with much of that exported to the US. But can they duplicate their earlier success in automobiles? The failure of the computer business at home makes a comparison difficult."

"In automobiles the Japanese have already fully exploited their own market," says Rapp. "They have a whole different competitive model now. You can't see the model, at least on wheels as yet."

Keith Jones meets the new chairman of the world's second biggest computer corporation, Michael Blumenthal

Burroughs favours Japan rather than UK for manufacturing expansion



BLUMENTHAL... Keen to expand in Japan

BURROUGHS, the world's second biggest computer corporation, has been dogged by two serious weaknesses: a lack of forward planning and inferior customer support, but these faults are now being tackled. And the company plans major offensives in areas such as very low-cost commercial systems and the electronic office as well as continuing to address all its traditional market sectors.

These were some of the key points made last week by the new chairman of Burroughs, Michael Blumenthal, during a visit to London.

Blumenthal dismissed reports that a merger might take place between Burroughs and the Bendix Corp, of which he is a one-time chairman, despite Burroughs' disappointing financial results for 1980. Profits plummeted from \$223 million in 1979 to \$82 million and turnover increased by a trivial \$71 million to \$2,830 million.

In 1980 many Burroughs plants suffered from indigestion due to less than perfect scheduling, in particular with the new 900 series.

Blumenthal, who toured Burroughs plants all over the world last year before assuming the chairmanship, told Computer Weekly that there were no plans to add new factories to the eight existing sites in the UK, the firm's biggest market outside the US.

But he revealed that he was talking to "UK government officials" about financial incentives for manufacturing expansion and would compare these with those offered by other European countries.

He is well used to government, having served as Secretary of the Treasury from January 1977 to August 1979 in the Carter administration.

Asked about the possibility of expansion in the UK or elsewhere in Europe by acquisition, Blumenthal described the acquisition approach as "no panacea". At the same time he was not "hung up" on any particular approach to expansion. His attitude was pragmatic.

While making more than 350 workers redundant at its factory at Cumbernauld in Scotland, Burroughs is keen to expand manufacturing in Japan. Blumenthal said that he visited the top ten computer manufacturers there recently to discuss the possibility of setting up a joint venture.

Blumenthal admitted that Burroughs might need to acquire certain technologies from outside if it wished to realise its ambitions in the office systems market. Digital switching technology would have to be acquired by acquisition, for example, if Burroughs wanted to make a "quantum jump" in the office systems area.

One recent move in the electronic sector highlighted by Blumenthal was the formation in January of a new Office Systems Group within Burroughs. It combines the products and operations of the former Office Automation Division of Burroughs with the Products Group of the Systems Development Corp, the big US services company bought by Burroughs for \$98 million last year.

SDC is particularly active in the big text editing systems area. Burroughs already possesses facsimile technology and word processor expertise through its Redactor division.

Turning to Burroughs' customer support problems, Blumenthal refused to comment on the hundreds of law suits filed in the US by users of the company's small business computers, including the B800, except to point out that there were thousands of satisfied B800 customers.

But he recognised that Burroughs had scored low marks compared with other suppliers for support in customer surveys. These include the survey of UK customers carried out last year jointly by Computer Weekly and Datapro.

Blumenthal commented, "These problems must be corrected for the sake of the company's image." He revealed that staff were being shifted from marketing into customer support and that a centre for controlling support resources was being set up in the UK in the Midlands in addition to similar centres in the US and Japan. The whole aim was to achieve a very short turnaround in response to customer requirements.

He also referred to the six staging centres set up in the last quarter of 1980 for checking out new machines before they are shipped.

At the time of announcing his poor 1980 results Blumenthal said that these staging centres were the reason for the company's very modest turnover increase. They slowed the booking of sales.

Blumenthal added that in 1980 many Burroughs plants had suffered from "indigestion" due to "less than perfect scheduling", in particular with the new 900 series of small business machines. He added that the company was now "substantially out of the woods" with these production problems.

Blumenthal agreed with the view that Burroughs in the past had been too interested in continuing to make a profit on a quarter-to-quarter basis. The loss of nearly \$69 million in the fourth quarter of 1980 - the main cause of the huge profit drop for the whole 12-month period - was the first for many years. It was the result of a \$125

Staff are being shifted from marketing into customer support.

million write-off relating to obsolete and returned machines and Blumenthal stressed the necessity of making such a drastic move even though it might not have been palatable to shareholders.

Blumenthal emphasised the need for Burroughs to invest for the future and pointed out that last September the company brought in Jerome Jacobson, described as a man with many years experience in strategic planning, to head up a new central planning activity. Blumenthal thought that Burroughs' weakness in planning had led to its failure to maintain its dominant position at the bottom end of the commercial systems market, the market for machines priced between \$10,000 and \$20,000. But Burroughs intended to attack that market aggressively, helped by its huge existing cus-

tomers base. The company had no plans at the moment to enter the home and hobby market addressed by suppliers like Apple and Commodore, and there were no plans either to follow the lead of IBM and Xerox by opening retail outlets.

One major investment for the future highlighted by Blumenthal was the \$80 million being put into its semiconductor facility in California at Rancho Bernardo near San Diego. It would concentrate on producing custom logic circuits for Burroughs computers. Another big spending area was applications software products development, the subject of an annual investment of \$50 million.

Blumenthal was emphatic about Burroughs' intention to continue to compete at the top end of the mainframe market despite the dominance of IBM. Asked if Burroughs was interested in joining the ranks of firms offering plug compatible alternatives to IBM machines, he said that this possibility had been the subject of internal studies by the company. But he added, "Burroughs has been successful because it has not been IBM compatible."

Blumenthal made no hint of any plans by Burroughs to expand significantly its sales activities in West Germany, a market where the company's presence is extremely modest compared with other major manufacturers.

Think of a vacuum cleaner and what name comes to mind?
Certainly not J. Murray Spangler.
Yet his was the first upright suction sweeper the world had ever seen.
So why didn't he clean up?
Lack of money, or business acumen? Or was it an absence of the right business partners?
Probably a little of all three.
Had our friend been around today however, his fate may well have been different.

For now there's a ready source of finance designed to help teams of technological entrepreneurs set up their own businesses.

It's called TDC.
Provided today's Mr. Spanglers can convince us their innovation and chances of success are promising, we'll back their enthusiasm with our own.

And with something a little more tangible.
£5,000 to £2,000,000 in venture capital.
You won't find us mean with help or advice either.
Our staff are all experienced in the kind of problems a new technological company may have to face.
And we're quite adept at devising original solutions.
Some might even say inventive.

TDC
91 Waterloo Rd., London SE1 8XR.
Telephone: 01-928 7822

TDC is a member of the Finance for Industry Group

Some people don't.

NEW FROM NASHUA

ORDER NOW

ALD12

Nashua ALD12 (DEC RLO) Computer. 16.5" Monitor. Top loading disc cartridge.

Please send me full information:

Name _____

Address _____

14413

NASHUA QUALITY

Nashua Computer Products, Cory House, Broomfield, Essex, SS12 8BN, England

It's easy to complain about advertisements.

The Advertising Standards Authority
If an advertiser is not satisfied, we will help to sort it out.
21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867, 1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893, 1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919, 1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 195

Disc and tape for H-P desk-tops

A 12-MEGABYTE Winchester-technology disc and popular ANSI-standard half-inch tape drive will be on offer shortly for use with Hewlett-Packard's desk-top computers.

Formerly interfaced only to HP's 1000 and 3000 computer systems, these two storage devices can now be used simultaneously or separately on HP desk-top computers.

Four HP desk-tops are accommodated, the Series 9800 Systems 35A, 35B, 45B, and the colour 9800 System 45.

The HP 7910H is a table-top unit, ready for immediate operation when plugged into the desk-top computer and includes a built-in controller, enclosure, power supply, and HP-IB (IEEE-488) interconnect cable.

A sealed module contains the HP 7910H head, magnetic disc, and actuator; failures arising from the improper installation of removable media or the introduction of contaminants are thus effectively eliminated.

This configuration is said to be suitable for use in unfavourable environments while built-in self-

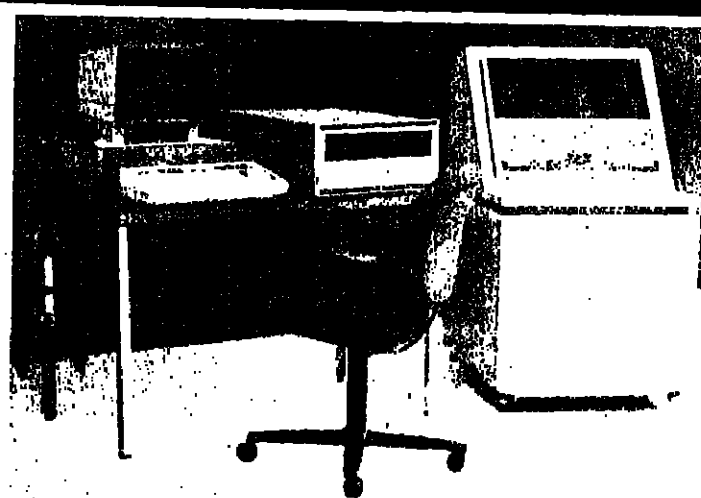
diagnostics may promote reliability and reduce maintenance needs. More than 50 routines verify proper operation, isolating malfunctions to individually replaceable assemblies and a 10-LED readout on the controller board displays self-test results.

Formatted capacity of the HP 7910H is 12.09 megabytes and each magnetic disc surface uses 735 tracks plus three spares, with 32 sectors per track and 256 bytes per sector.

The HP 7970B tape drive, with its own Option 826 HP-IB (IEEE-488) interface, brings HP desk-top computer users the benefits of recording or storing data on 1/2-inch ANSI-standard magnetic tape.

Data may be exchanged easily between desk-tops and larger computers and large amounts of data stored on common media.

The HP 7910H disc retails at £4,584, the list price of the HP 7970B Option 826 being £7,247 with first customer deliveries of both products expected in April. Hewlett-Packard Ltd (CW), 308-314 Kings Road, Reading, Berks. Tel: Reading 61022.



HP 7910H disc (centre) and HP 7970B (right) make their debut.

Aimed at scientific market

A SIMPLE system with what is claimed as a near-limitless potential when attached to standard microcomputers has been devised by the Physics and Radioisotopes Services of ICI Petrochemicals.

The GammaTrol Interface System comprises a small master unit measuring 200 x 120 x 120mm accommodating up to eight signal boards. It allows communication between a Commodore Pet and a variety of external devices.

Current uses range from control of a critical crystallisation process

on a large chemical plant to that of a university teaching aid.

The user can easily select a combination of input and output options matching his or her requirements.

The analogue and digital options may be expanded later by adding more from a comprehensive range of plug-in boards.

Physics and Radioisotopes Services, PO Box 2, ICI Billingham (CW), Cleveland. Tel: (0642) 553601 Ext 3572/2727/3761.

Modata launches a multi-user system with flexibility

MODATA announces the DSC-4 computer system offering dedicated computing facilities with comprehensive network capabilities.

"Modata's networking enhancements are an integral feature of the DSC-4, with Multibus board expansion and software configurable output ports providing the user with a flexibility enabling the computer system to grow as his requirements grow," claimed Modata marketing director Bryan Barnes.

The DSC-4 comprises a processing unit and dual floppy disc drives in one unit offering the small user 128 K-bytes of RAM and a choice of single or double density data storage.

When used as part of a network, memory mapping provides each user with a share of 512 K-bytes of RAM while sharing CPU operation.

Outputs to printers, modems and VDUs are provided through four RS232 connectors with transfer speeds user selectable from 150 to 9,600bps and an RS422 option

allows high speed data transfer up to 500 K-bps for local networks. Two parallel data ports enable connection of high speed prime and Digital Microsystems VDU hard disc unit, which offers from 14 to 28 megabytes of store.

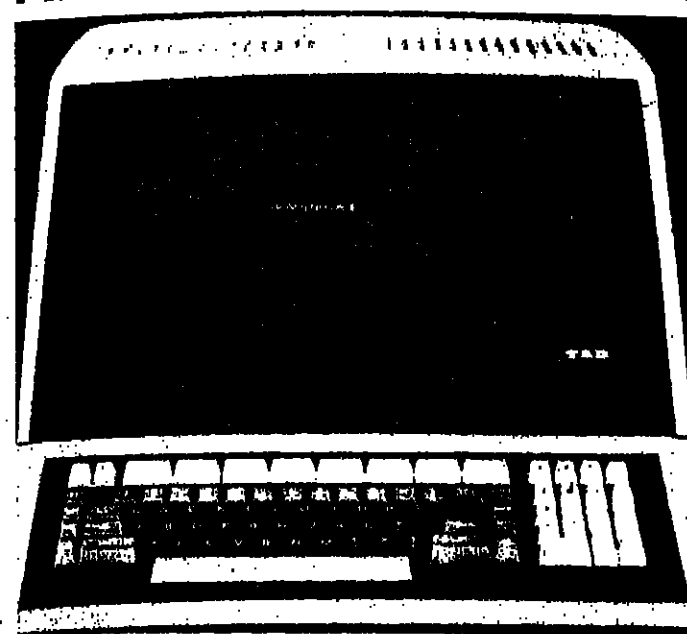
There is a variety of software packages available for the DSC-4 including accounting, payroll, order processing, stock control, and word processing.

DSC-4 uses the CPM word operating system, offering the user additional software from the large CPM range of programs.

The combined software support offered through Modata's design of the DSC-4 may suit a many application areas where one or more users require computing and memory facilities.

Word processing systems comprising printer, VDU and DSC-4 are available from dealers from £6,500.

Modata Ltd (CW), 30 St John's Road, Tunbridge Wells, Kent TN4 9NT. Tel: (0892) 4155.



TAB 132/15 - legible characters on non-glare screen.

Keeping TABs on display terminal

PERIPHERAL HARDWARE announces the TAB 132/15 Video Display Terminal, for which it is exclusive UK distributor. The terminal is said to offer all DEC VT100 and VT132 features at a comparable price.

There are additional benefits like a 15in CRT display and large, easily legible characters on a non-glare screen, other advantages including a versatile "soft" key function and four-page internal memory equivalent to 7680 characters.

The screen handles 24 data lines, each of 80 or 132 characters, plus one blank and two prompting lines. Letters are formed with true descenders by a 7 x 11 pattern in a 9 x 16 dot matrix.

Besides the ASCII set there are graphic characters for line drawings, form images and other graphics.

Character attributes, which can be used in any combination, include bold, blink, underline, reverse video, double height and double width.

The screen is available in green

or white phosphor and can produce both dark letters on a light background and light on dark.

TAB 132/15 has 392 scan lines, over 50 per cent more than standard terminals, with resolution claimed to be improved greatly.

Even at 132 characters per line, words are legible at normal viewing distance. Specific functions of the eight "soft" keys are assigned by the operator or host computer.

TAB 132/15's electronic keyboard can be detached and keys are sculptured for operator comfort, the 88 active keys being supplemented by space for a further 16 to allow for future expansion and custom designing.

The keyboard is also provided with N-key rollover, permitting the operator to key at maximum speed without missing strokes.

The terminal is available at short delivery notice with demonstrations on request.

Peripheral Hardware Ltd (CW), Armfield Close, West Molesey, Surrey. Tel: 01-941 4806.

Time and cost saving

INMAC has introduced what it claims as a time and cost-saving internal cable assembly for Data General computers to link with DG computer discs, diskettes, magnetic tape units, card readers, line printers and other parallel devices.

The user slips the connectors, directly to the DG computer backplane and secures the paddleboard; INMAC claims that he saves up to £70 and also the later problem of

lengthy disconnection if the equipment has to be reconfigured.

Besides this new internal DGC-compatible cable, Inmac also stocks a wide range of the most popular DGC compatible cables for next day delivery in the UK and 2-3 day European delivery.

Inmac (CW), 18 Goddard Road, Astmoor Industrial Estate, Runcorn, Cheshire WA7 1QF. Tel: 09285 67551.

Alphanumeric model

BURR-BROWN has expanded its low cost Microterminal product line with the TM71 alphanumeric model costing £299 and suited to applications involving complex data, but where space is limited or the operating environment hazardous.

The waterproof TM 71 measures 21.59 x 11.43 x 1.52cm (8.5 x 4.5 x 0.6 inches) and contains a 42-key keyboard, a shift function allowing generation of up to 80 characters.

Also included on the front panel is a 16-character LED display and six LED indicators - two

controlled directly by the host CPU and four indicating terminal status.

Four 80-character buffers are provided within the unit, two for data to be transmitted, and two for received data.

Communication between the CPU and the TM 71 is via either RS232C/V24 or 20mA current loop interface.

Up to 15 terminals may be connected on the same serial interface. Burr-Brown International (CW), Caslebury House, 11-19 Station Road, Watford, Herts. WD1 1EA. Tel: (0923) 33837.

Terminal table for UK

A ERGONOMICALLY designed computer terminal table, which according to UK distributor Planned Office Interiors has 40 per cent of the German market, has been launched in the UK.

It can be provided with a comfortable range of special purpose units, for example floppy disc units and a fully adjustable

screen and keyboard can be tilted and moved to a position suiting the individual user.

It comes in a standard melamine finish, although alternative finishes are available. It costs £349.

Planned Office Interiors (CW), 18 St Martin's-le-Grand, London EC1. Tel: 01-406 3377.

PIP 85 makes data acquisition debut

THE Control '81 exhibition at the Kensington Centre marked the debut of MC Computers' PIP 85 distributed data acquisition system, described as an economical and efficient model.

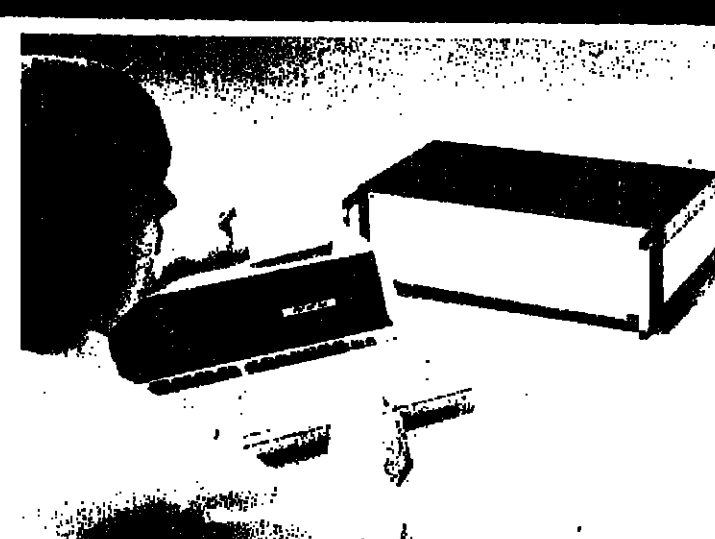
PIP 85 will be marketed by MC's parent company Micro Consultants, and comprises two portable units, the Hewlett-Packard HP-85F and MC's Plant Interface Peripheral (PIP).

Using an IEEE interface, the PIP 85 system allows multipoint operation, linking up to eight PIP input/output units to the central

HP-85F - including remotely-sited units communicating over two-wire telephone links.

In operation, the PIP 85 is distinctly user-friendly, employing question and answer prompts derived from conversational extended Basic. This is both easy to learn and implement, making full use of the computer's integral keyboard, CRT display, strip printer and tape unit.

Micro Consultants Ltd (CW), Kenley House, Kenley Lane, Kenley, Surrey CR2 5YR. Tel: 01-688 4151.



PIP 85 employs question and answer prompts.

Thermal printer with complete control built in

THE DATEL-Intersil APP-48 is a 48-column panel-mount thermal printer with complete control and interface electronics built-in, measuring 8.12 inches wide x 2.84 inches high x 8.32 inches deep (206.3 x 72.2 x 211.3 mm) and weighing less than 6lb (2.7 kg).

APP-48 can fit in crowded control panels or inside larger OEM products. Because it is panel-mountable, it is said to

operate behind closed doors on the same panel with process control or laboratory instrumentation.

An RO (Read-Only) terminal, the APP-48 is a complete data output computer peripheral, which can work with most microcomputers or serial ports that support RS-232C or 20 mA loop outputs.

All necessary control lines required to interface with a microcomputer are built into the

APP-48 which is also a thermal printer, forming characters within a 5 x 7 dot matrix and priced at £499.

A built-in microprocessor controls all printer functions, permitting an entire line of print to be turned upside down. A whole page printed in inverted mode presents the last entry first when the printout is read.

The APP-48 prints full 92-char-

acter, upper and lower case ASCII alphanumeric, and a second set of 92 special figures, currency symbols, mathematical symbols and Greek letters.

OEM discounts are available and delivery is two to six weeks. Intersil-Data Ltd (CW), 9th Floor, Snamprogett House, Basing View, Basingstoke, Hants. RG21 2YS. Tel: (0256) 57361.

THE INTERNATIONAL COMPUTING SYMPOSIUM



The sixth ACM European regional conference in cooperation with Computer Communications and Microprocessors and Microsystems on

SYSTEMS ARCHITECTURE

March 30, 31 & April 1, 1981

The Institute of Education, University of London
London, England

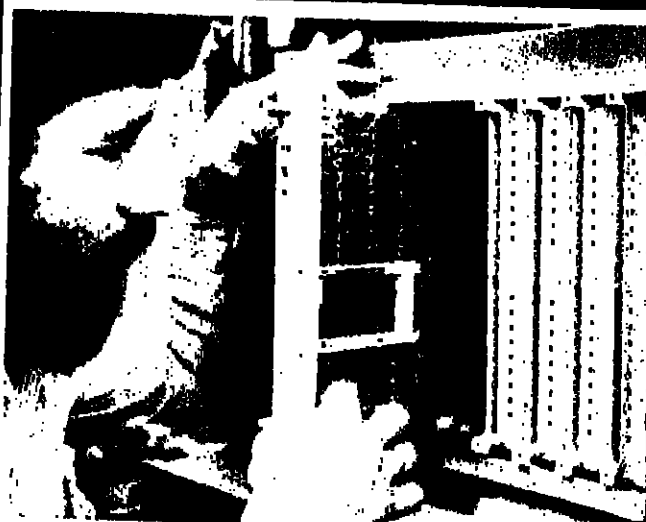
The primary goal of the symposium is to report on the state of the art and to foster the exchange of ideas among scientists, computer professionals, engineers and managers on problems, new techniques, and trends of "Systems Architecture." Like its predecessors the symposium will be the foremost platform world wide for presentations and discussions. At this symposium topics under discussion will be the significant developments in the important and rapidly expanding area of Systems Architecture.

The line up of distinguished session chairmen, invited speakers and authors totals 78. They are well-known in their specialist fields and are of international repute. The 80 papers presented were selected from over 160 submissions to give a balanced and authoritative overview of the subject.

Topics to be discussed will include:

- Distributed architecture
- System specification and requirements
- Communications
- Man/machine interface
- Fault-tolerant systems
- Tools and management
- Information and system management
- Software and system architecture
- Microprocessor and microprogramming
- Language design
- Data base architecture
- Analysis and construction of large systems
- Data flow architecture

For full details write to Christine Jones
Conference Administrator, IPC Conferences Ltd, Surrey House
Throwley Way, Sutton, Surrey SM1 4QQ, England
Tel. 01-643 8040; Ext. 4890



Inspecting fine detail on the Sinatic S5 program controller.

Siemens releases new program controller

GROWTH rates of 50-60 per cent per annum in recent years now make programmable controllers like the recently introduced Sinatic S5 from Siemens Ltd technologically popular as numerical controls and process computers.

The Sinatic S5 may interest users wishing to implement extensive automation systems and requiring computer-like equipment, but who only have limited space available.

Sinatic S5 design features include an absence of fans, signal voltages up to 220V, simple module interchangeability and easy access to external connections.

Siemens' range now includes new compact central processing units, the S5-130K and S5-130L units having the same functions as the S5-130A and S5-130B type-discrete versions.

A compact S5-130W central processing unit supplements the medium performance range. Its performance features include RAM and EPROM memories with up to 16K capacity, 52 inputs and 512 outputs and an operator's port with binary logic functions.

Siemens Ltd (CW), Siemens House, Windmill Road, Stoney-on-Thames, Middlesex, TW16 7HS. Tel: (09327) 85691.

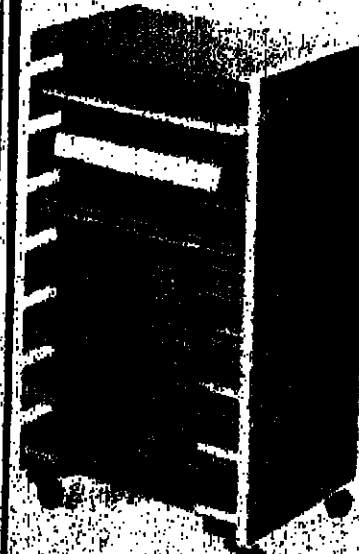
Data on wheels

ELDON'S Data Cart has been designed for computer firms and all users of computer data printers. The practical and mobile Data Cart, part of the ELDON Organisers range, consists of seven trays accommodating up to 4,000 computer printout sheets.

Horizontal storage eliminates the inconvenience and expense of binders and the dual label area on each tray ensures easy identification and retrieval.

Overall dimensions are 735mm high x 318mm deep x 430mm wide, each tray holding documents up to 484mm x 280mm.

ELDON Office Products (Europe) (CW), Unit 3, Clifton Road, St John, Bedfordshire SG17 5AB.



ELDON's Data Cart: designed to keep printouts in order and mobile.

ComputerWeekly brings you COMPEC NORTH'81

Belle Vue,
Manchester
June 23-25, 1981



For better communication with the heart of industrial Britain

The sponsors and organisers of COMPEC are proud to present the first extension outside London of that event - the largest, most comprehensive and most visited computer show in Britain. For details, send the coupon NOW.

COMPEC NORTH'81

To: Compec North, c/o IPC Exhibitions Ltd,
Surrey House, 1 Throwley Way, Sutton, Surrey, SM1 4QQ.
Please send us more information about exhibiting at COMPEC NORTH

Name _____
Company _____
Address _____

ip 4 no 138

Japanese computer companies are very keen on their staff learning EnglishKevin Cahill reports on a growth area

Teaching the industry's lingua franca in the Land of the Rising Sun

THE Japanese government recently launched its fourth successive programme to recruit teachers of English to work in Japanese universities and companies. And at least one British programmer has discovered he is as much in demand as an English teacher, as he was as an instructor of machines.

The Japanese programme is not specifically aimed at computer companies, but the country's major computer manufacturers are among the heaviest spenders in Japan on English language training.

In general, the computer companies are faced with two problems. Firstly, most computer languages in common use are what linguists call truncated forms of English. Cobol, Basic and Fortran statements are all framed in the form of English words or phrases.

Secondly, the major markets of North America, the UK, Australia and New Zealand are all English-speaking.

So how do the big four members of Japan Inc - Mitsubishi, Fujitsu, NEC and Hitachi - cope with the problem of teaching their staff English?

In the recent past, the four companies ran most of their English language courses in-house, using Japanese teachers to give the courses. Occasionally a teacher would be hired from outside, either from one of the English language schools such as the Oxford School of English, or privately through an established contact.

A spokesman at Mitsubishi explained that there has been a change recently. More of the courses were being done out-house, with schools like the International Language Centre, and Oxford.

According to the same source, more than 90% of all the in-house courses given in the big four computer companies were language courses, with English probably accounting for most of the units taught. This is in sharp contrast to the average UK company, where most of the courses taught are task or management oriented and language courses are very rare.

In Japan, most of the executives in the computer giants will have learned English from the age of 11 or 12, because English is Japan's number one foreign language. They will have continued their English courses at university.

More than 90% of all the in-house courses given in the big four computer companies are language courses, with English probably accounting for most of the units taught.

Chris Ward of ILC says that English special purpose courses, such as computer English, are not popular in Japan. Technical Japanese uses loan words, mainly from American English. Often specialists can deal with technical English but not English conversation, which partly explains the demand for general English.

According to an English employee of Nippon Electric, who has been in Japan, it is not unusual to find senior analysts and programmers taking private English lessons at night in the morning. These lessons are given privately by teachers working at the Japanese language schools.

Computer Weekly contacted Bill Roff, a former programmer

with a European based multinational who now works for the ILC in Tokyo, the biggest English language teaching organisation in Japan.

Bill has been in Tokyo for five years and reckons he will stay there much longer. He left his programming job because, he says, "The initial novelty wore off. The job was a mixture of tedious paper work with one deadline after another, interspersed with hectic European jaunts. I thought I was heading for ulcers and decided it was time for a change. A classic case of dropping out, I suppose."

Bill was attracted to Japan by the idea of somewhere completely unknown to him, and saw the ILC ad in a Sunday paper.

Special purpose courses such as computer English are not popular ... Technical Japanese uses loan words, mainly from American English. Often specialists can deal with technical English but not conversation ...

CW asked him how he found living in Japan.

"It's like living in Toytown," he said. "It's safe and predictable. Everything works and trains run on time. Some foreigners complain that they are never accepted into Japanese society, but for the escapee it's ideal. You are always on the edge of society as an observer rather than a participant. The language is fascinating and deserves a lifetime of study."

Bill added wryly that there were all sorts of frustrations and the only way to deal with them was to adopt a phlegmatic approach. The Colonel Blimp approach simply did not work in Japan.

Bill found the teaching itself very easy.

"With adult classes there are no discipline problems though there is a need to adjust to cultural differences. There is little opportunity for self-assertion and no room for blistering debates."

"It's vital to be receptive to the Japanese students, whose unspoken reactions can be more important than spoken reactions in the UK. A smile can mean embarrassment. The students want teachers sympathetic to things and attitudes Japanese. The super-zappy approach just overwhelms them."

Roy Evans, personnel director at ILC UK, who worked in Japan from 1973 to 1977, said that it was English language teaching that had risen in Japan all through the last recession.

Although the Japanese economy had remained fundamentally out of recession, the same phenomenon had occurred.

The number of schools teaching English has risen to an almost exponential rate. ILC's Japanese associate school now has a record number of teachers, 50 in all, mostly from the UK, and the company has opened a second branch in Tokyo. The Osaka and Tokyo branches are now teaching over 2,000 students on some 150 courses.

The average take-home pay of the company teachers is about £600 per month, much less than

the £20 per hour which is readily obtainable for teaching English privately.

On the other hand, the big schools provide their teachers with assistance in obtaining accommodation. This is usually in the form of paying the key money, a sort of premium on letting which can equal six months' rent, according to Roy Evans. This one item has probably done more to generate the myth of Tokyo as an expensive area than anything else. Flat rents are about the same, maybe 10% above London rates.

Here in the UK, IBM runs a permanent English language programme with ILC's associate, IH, in Hastings.

According to IBM, English is the lingua franca of the international computer industry, and over 100 senior executives from IBM International went through the IH programme in 1980.



Learning English at the International Language Centre School in Tokyo. It is not unusual to find senior analysts and programmers, unable to follow daytime courses, taking private English lessons at night in the morning.

COMPEC EUROPE '81 MAY 5-7 1981 EXHIBITION-BRUSSELS



SPECIAL TRAVEL ARRANGEMENTS

COMPUTER WEEKLY in association with COMMERCIAL TRADE TRAVEL LTD., has arranged special trips to Compec Europe Exhibition in Brussels. Accommodation has been reserved at the SHERATON Hotel in Rogier Place, opposite the fair grounds.

Itinerary

There are two special arrangements, one for Exhibitors, staying five nights, and one for Visitors, staying two nights. Flights are by scheduled services from London (Heathrow or Gatwick) Airports on flights of your choice subject to availability.

Price per Person (Sharing twin bedded room with facilities)

Tour A 5 nights	Sheraton Hotel £265.00
Tour B 2 nights	£175.00
Single room supplement (per night)	£20.00
Accommodation Only Twin with Bath	£89.00 per night
Single with Bath	£80.00 per night

How to Book

Complete the booking form and post immediately to the tour operators, Commercial Trade Travel Ltd., Carlisle House, 8 Southampton Row, London WC1. Tel: 01-405 8666/5469. Telex: 21792/949. A deposit of £30 per person is required and cheques should be made payable to Commercial Trade Travel Ltd. A confirmatory invoice will be sent and the balance is payable on receipt of invoice. Tickets etc. will be despatched about 7-10 days before departure.

Booking Form

Name: _____ Address: _____ Telephone: _____

Company: _____ Department: _____

Exhibitor/Visitor: _____

Flight: _____

Accommodation: _____

Food: _____

Transport: _____

Other: _____

Signature: _____ Date: _____

Appointments

THE NEWSPAPER COMPUTER PEOPLE RELY ON Appointments

Computer Weekly

Classified Department, Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS

Best Numbers: Should be addressed to the box number in the advertisement or Computer Weekly at the above address

Classified Rates: £19 per sec. 10 x 3 cols. = £27. 30 x 3 cols. = £1.470. Half Page (10 x 7 cols) = £1.530. Full Page (10 x 13 cols) = £2.950

Copy Deadline: 3.30 pm Monday prior. Thursday publication date. Complete artwork by 11 am Tuesday. Advanced space reservation is advisable

LONDON 01-661 0121 (8 lines)
Chris Price, Assistant Classified Manager
John Watford, Classified Supervisor
Neil McDermott, Consultants
Jan Faux, Consultants
Julia Hamblin, Communications
Dennis Smith, General Appointment
William Johnson, General Appointment
Keren McDermott, General Appointment
Peter Regan, General Appointment

MANCHESTER/GLASGOW
Owen Kelly 061 872 8861
Geoff Alison 061 472 8861

BIRMINGHAM/BRISTOL
Vic Stone 011 354 4838

Circulation Production 01-661 3500 Ext 3104 Steve Law

Recruitment Consultants

Salary Package + Car negotiable

Our successful formula of experience, attitude and responsiveness aimed at providing the best possible service to clients and candidates alike, has created the need to expand to meet demand. Ideally, you should have several years varied experience in the computer industry which will enable you to relate to clients' needs and understand their constraints. You should have an interest in assessing and advising candidates on their most favourable career choice. Your success and our reputation will follow from genuine care in matching candidates with clients. You will be given every encouragement to develop your own campaigns, to try new ideas and to apply initiative in building personal contact with your client base.

The total remuneration package is negotiable depending on experience. Candidates with no previous experience will be considered on their merits. Contact Terry Harvey, anytime, in complete confidence.

Project Manager

E. Berks. to £12,000 + Car
Our client requires an experienced computer person to act in a liaison capacity between client and in-house development teams. Candidates should be personable, tactful and technically competent to deal with hardware and software groups. He/she should have good administrative and organising abilities. There are excellent prospects for the right person.

Applications Support Analysts

N.W. Home Counties c. £5,000 + Car
Our client is seeking a number of analysts for their U.K. support team. Ideally, you will have 2 to 3 years experience as an analyst/programmer in a commercial environment. You will be involved in providing pre and post sales advice to clients for applications on a micro based W.P. system which has a growing number of D.P. functions. Large Company benefits and conditions apply.

Programmer/Analysts

C. London £7,500 to £9,500
Our client, a leading firm of management consultants, is seeking a number of programmer/analysts with two or more years commercial implementation experience, to join an established team working on a range of business and industrial packages. Equipment is PDP 11/34, WANG 2200 and IBM 5120. Candidates must be degree level with DIBOL and/or BASIC programming experience.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings Gt. Missenden (02406) 4705 or daytime as below.

HR

Harvey Recruitment

Executive and Computing Personnel Consultants

500 Chesham House, 150 Regent Street, London W1R 5LA Tel: 01-734 5351

HR

IBM OPERATOR

Circa £5,500

A leading computer services and systems company has asked us to find an IBM operator with at least 2 years' 3800/370 DOS/GRASP experience.

Although currently based in W.I., the company will be moving to Harrogate later this year, where a new Data Processing Centre will house a 4341 running OS/VS1 utilising VM, CMS and QJES.

The new centre will also house several SYSTIME 3700s, a PRIME 650, and two HONEYWELL DPS 1200s.

Candidates will be given considerable scope to utilise their skills and full training where necessary.

For further information contact Mike Mansour on 01-225 8801 or 04747 8020, evenings if possible.

Ref: 02/15

AGB Recruitment Limited

Analyst/Programmer Computer Services

MONTROSE

We are responsible for the UK manufacture of Glaxo pharmaceuticals and their sale in this country.

The company is engaged in the implementation of a large network of Hewlett Packard mini computers involving all company locations and based around the Company headquarters in London. There is a major development programme of advanced online systems being built around a distributed database predominantly in the production planning inventory control and quality control areas.

We now require an Analyst/Programmer at our Montrose installation which presently operates an HP 3000 Series 33 computer.

This is an opportunity to contribute in a most exciting and rapidly growing environment, and candidates should already have substantial experience. Know-

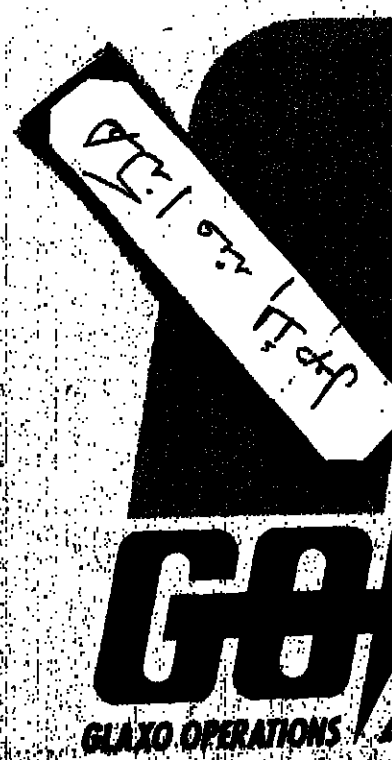
ledge of Hewlett Packard Software would be an advantage although necessary training will be provided. The predominant programming language is COBOL.

In addition to an attractive starting salary, our first class benefits package is what you would expect from one of the most progressive British companies.

Montrose is a thriving coastal market town within easy reach of Dundee and Aberdeen and surrounded by some of the most delightful scenery in the country.

A good place to earn a living, an even better place to live.

Please write or telephone for an application form, quoting reference 185, to: Mr. M. Ryan, Personnel Department, Glaxo Operations UK Ltd, Cobden Street, Montrose DD10 6BB. Tel: (0674) Montrose 2606.



We are responsible for the UK manufacture of Glaxo pharmaceuticals and their sale in this country.

The company is engaged in the implementation of a large network of Hewlett Packard mini computers involving all company locations and based around the Company headquarters in London. There is a major development programme of advanced online systems being built around a distributed database predominantly in the production planning inventory control and quality control areas.

We now require an Analyst/Programmer at our Montrose installation which presently operates an HP 3000 Series 33 computer.

This is an opportunity to contribute in a most exciting and rapidly growing environment, and candidates should already have substantial experience. Know-

ledge of Hewlett Packard Software would be an advantage although necessary training will be provided. The predominant programming language is COBOL.

In addition to an attractive starting salary, our first class benefits package is what you would expect from one of the most progressive British companies.

Montrose is a thriving coastal market town within easy reach of Dundee and Aberdeen and surrounded by some of the most delightful scenery in the country.

A good place to earn a living, an even better place to live.

Please write or telephone for an application form, quoting reference 185, to: Mr. M. Ryan, Personnel Department, Glaxo Operations UK Ltd, Cobden Street, Montrose DD10 6BB. Tel: (0674) Montrose 2606.

PROJECT LEADER ICL 2904

CITY
Our clients are a leading member of the London commodity market who seek an enthusiastic project leader for their ICL installation.
Candidates, who will lead a small team, should be aged about 30, have a programming and analysis background and have successfully completed 1 or 2 projects, from design through to implementations.
Some U.K. travel is involved and the accent is on enthusiasm.
In addition to an excellent salary, the company offers a non-contributory pension scheme, and free BUPA.

to £10,000

PROGRAMMERS IBM 370

LONDON
As a result of continued expansion, a very successful trading company on the fringe of the city urgently require still more PL1 programmers.
Candidates should have a minimum of 2 years' PL1 programming, which has been gained in a team environment with involvement in at least one medium system. IBM Cobol programmers may also apply.
Apart from the salary the company offers good chances for promotion and numerous benefits, benefiting an organisation of their reputation.

c. £8,000

JNR. ANALYST/PROGRAMMERS IBM 4341

LONDON
Openings exist within a leading oil company for junior analyst/programmers who can show a successful career path within the computer industry together with a good educational record.
Their requirement for at least one year's commercial COBOL programming on IBM 370 or 4300 machinery together with at least good 'A' levels or, preferably, a degree.
In return they offer a definite career structure with ample training facilities, and the very best in company benefits and working conditions.

to c. £8,500

PROGRAMMER/ANALYST RPG II

LONDON, CITY
An excellent opportunity has arisen for a Programmer/analyst who would like more involvement with systems design. The company you will be working for are totally involved in banking and are American owned.
Ideally you should have between 2-4 years' RPGII Programming experience and a good theoretical knowledge of system design. A good knowledge of banking applications is also required.
The company offer an excellent career path coupled with regular training courses and benefits including subsidised restaurant, sports and social club and mortgage facilities at well below building society rates.

to £10,000

RPG II PROGRAMMERS

LONDON, H. COUNTIES
Datascene have recently taken a considerable number of vacancies for RPG II Programmers in London and the Home Counties.
The range of industries within the client database are wide ranging but include Petrochemical, Banking, Insurance, Engineering and Software houses.
Ideally you should have at least one year's experience but preferably 18 months' together with a good standard of education.
Progression within the various departments is good as all companies offer career progression.

to £10,000

BASIC, BASIC + PROGRAMMERS

LONDON/CITY
We are in contact with a number of Basics who are seeking programmers with upwards of eighteen months' experience in business BASIC, BASIC +, BASIC +2, or AIMS. Successful applicants can expect to be working in a batch and real-time environment on applications such as foreign exchange and eurobonds. Opportunities for career progression are excellent and the employment packages offered include interest free season ticket loans, productivity bonus schemes, staff restaurant/lunch vouchers and low interest mortgage facilities.

£7,500-£9,500

ANALYST/PROGRAMMERS & PROGRAMMERS

S.W. LONDON
A leading manufacturing company require an experienced Senior Analyst/Programmer, one Analyst Programmer and one Programmer to complement their existing team. Experience required ranges from 2/5 years' of on-line working with COBOL. A sound knowledge of commercial application and project management will be advantageous to those applicants applying for the senior positions offered. The company benefits include five weeks' holiday, product discount, subsidised canteen and Pension Scheme after one year's employment.

£7,500-£10,500

HEWLETT PACKARD 3000 COBOL

LONDON/HOME COUNTIES
We have several Hewlett Packard clients with current vacancies for experienced Analysts, Analyst Programmers and Programmers. Experience required is from 1 1/2 years' upwards of standard of education. Progression within the various companies is excellent as all offer solid for suitably qualified applicants.
The above vacancies are only a small selection from those currently on our files and we are always delighted to talk to experienced systems and programming staff wishing to further their careers.

£7,500-£9,000

Datascene International Limited
Scaple House,
169-173 Regent Street,
London W1R 7FB. Tel: 25831

01-439 7871
24-hour answer phone

Technical Service Engineer-Europe computer peripherals progressive salary+ car

Among its many fields of interest, 3M markets professional data recording equipment. We are now seeking a Technical Service Engineer to provide technical support for our sales personnel and customers throughout Europe.
We are interested to hear from electronics engineers qualified to at least HNC level who have gained wide-ranging practical experience in advanced digital technology.
Working from our base on the west side of London, you will spend a

considerable proportion of your time on field visits to customers' premises in Europe, so personal mobility is essential. Full product training will, of course, be provided.
The impressive remuneration package consists of competitive starting salary plus company car and an extensive range of large-company benefits.
Write with personal and career details to: K. B. Jackson, Employee Relations Manager, 3M United Kingdom Limited, 3M House, PO Box 1, Bracknell, Berks. RG12 1JU.

3M

Anglian Water Authority

The AWA provides the water supply, sewerage and sewage treatment, water conservation, land drainage and other important water services for over a fifth of England. Applications are invited for the following posts in the Corporate Planning and Management Services Department based at the Authority's Headquarters in Huntingdon.

PLANNING OFFICER

Salary up to £7,941 Ref. H2M007
This post is principally concerned with the maintenance, analysis and development of the Authority's Corporate Planning System, and advice on computing to the Corporate Planning/Management Services section.
The duties include responsibility for staff involved in the day to day running of the Capital Development Programme Data Base and the provision of reports and models used in its analysis.
The post requires a flair for problem solving and some computer programming experience. Knowledge of data base management or project information systems would be useful.
General relocation expenses will be paid in appropriate cases. If you are interested please call Huntingdon (0480) 86181 Ext. 2 for information and application form.
The closing date for applications is Friday 27th March 1981, and should be sent to the Assistant Director (Planning).

ANGLIAN WATER AUTHORITY
Ambury Road, Huntingdon, Cambs.

ipcmagazines

PROGRAMMER/ANALYST On-Line Commercial Systems Fortran Prime

Our small development team is being expanded to cope with the demand for new on-line systems. The hardware is a dual Prime 400/550 configuration. The software is Fortran, Midas and our own screen handling routines. Applications include: -- Order Processing -- Invoicing -- Survey Analysis -- Marketing -- Planning. At least two years Fortran programming experience preferably with some commercial content. Familiarity with on-line program development, knowledge of Primos and/or indexed Sequential files would be desirable. Ability to communicate clearly with user departments. Salary £8,000-£9,070 (review due April). Phone or write to David Hardill, IPC Magazines Ltd., King's Reach Tower, Stamford Street, London SE1 9LS. Tel: 01-281 6818.

BOX NUMBERS

Box number replies should be addressed to:
Box Number
c/o Computer Weekly
The Old Bank
Sutton, Surrey SM2 5AR

CONTRACT

ANAL PROGS & PROGRAMMERS
Various locations
ANAL PROGRAMMERS
Indefinite contract, Central London

THE OPEN UNIVERSITY FACULTY OF TECHNOLOGY COMPUTING UNIT

PROJECT OFFICER

The unit has a vacancy for a Project Officer from the 1st April, 1981. Applicants should have a degree in Computer Science (or similar) and several years' experience with the UNIX operating system and C language. A knowledge of other languages and systems, particularly Pascal, Fortran, VMS and RDBS would be an advantage.
Wide-ranging duties include the installation and maintenance of systems programs, course software for micro and a PDP-11/60, but there may be work on B.S. Novell, VAX 11/780 and DEC 20.
Salary will be on the Grade 1A scale for Project Officers.
Application forms and further particulars are available from Mrs. S. McQuarrie (01072) Faculty of Technology, The Open University, Milton Keynes MK6 3PH. Tel: 0527 89611. There is a 24-hour answering service on 052789611.
Closing date for applications: March 30.

PROMOTION FOR SALESMEN BASIC £10,000-£15,000 ON QUOTA £30,000 + CAR OF YOUR CHOICE

Our client, a major European Mini Manufacturer, has just launched a UK subsidiary selling into commercial users. This leader seeks to extend its reputation for reliability and performance by building on its existing impressive turnover of £100 million, total group sales exceed £400 million. This guarantees stability and future investment in people like you. With realistic quotas and generous bank, highly ambitious Sales Executives capable of demonstrating a proven track record in mini computer systems can expect early promotion and real rewards in a dynamic environment that offers real growth and offers you the chance of this challenge and live in London or Home Counties, then call Clinton Hardy Davies today, but hurry!

ALLTRONICS PEOPLE (AGY) Tel: 01 563 4544

MYRIAD

DEVELOPMENT PROGRAMMERS CAD SOFTWARE

WILTS./GLOS. BORDER

£7,000-£8,500

A household name and a pioneer in the research and development of high technology communications products. Our client already has a respected and successful range and is continuing to invest in the development of advanced Systems for Business.

You should offer:

- ★ A good degree (Electronic Engineering or Physics preferred)
- ★ 1-3 years' post graduate experience
- ★ Sound high-level programming (most work is in FORTRAN 77 but PASCAL/ALGOL or BASIC would also be relevant)

Whilst previous experience of CAD would be useful it is by no means imperative. A DEC VAX 11/780 is installed for system development and full training will be offered where necessary. Excellent conditions of employment apply including full relocation expenses where appropriate. To apply either telephone Myriad on the number below or write quoting reference RN1/1203/CW.

Computer Aided Design is an important aspect of product development and the company's CAD Group is responsible for the provision of computer aids for all the development departments. Special emphasis is placed upon LSI and hybrid circuit design and layout.

Applications include:

- ★ Interactive graphics
- ★ Design Automation
- ★ Circuit Analysis

MOVE INTO FINANCE £8,500 - £10,500 + BENEFITS

One of the CITY'S leading financial organisations has committed a large investment in high technology thereby giving their DP department a development plan that will enable the Company to remain a major force in international finance.
TP software and intricate databases will process transactions in a fraction of the time thought possible a few years ago.
Located in the heart of London, our client can offer a secure and positive future and all employees enjoy a range of worthwhile benefits that further enhance a generous starting salary.

PROGRAMMERS c. £9,000
A good understanding of COBOL will give you the opportunity of increasing your technical knowledge on IBM equipment plus training in systems analysis. CICS and/or database experience could take your salary into five figures and for this you would be expected to lead a team of programmers and assist with systems design.

ANALYSTS c. £10,000
To be involved with all aspects of project development, the ANALYSTS will be sympathetic to users and programmers alike ensuring that both groups work in harmony. Candidates could well be Analyst/Programmers seeking a full Analyst role and persons with a financial background will have a distinct advantage.
Ref. S1/1203

PROGRAMMERS TO PROJECT LEADERS

ESSEX £6,000-£10,000

Our client has outstanding openings for Programmers to Project Leaders who wish to further their career on an interesting variety of applications.
Vacancies range from applications PROGRAMMERS through to SENIOR ANALYST/PROGRAMMERS and PROJECT LEADERS. Successful candidates will work within a stimulating and highly professional environment using the most advanced techniques on a range of development projects.

PROGRAMMERS should have a minimum of eighteen months' application programming using COBOL.

ANALYST/PROGRAMMERS should have a minimum of two years' experience and these positions will appeal to Senior Programmers who wish to move into systems analysis.

PROJECT LEADERS should be capable of designing and controlling projects from feasibility to implementation.

The company has an outstanding record of growth and in addition to excellent conditions of employment offers a secure and progressive future to the people appointed.
Ref. BU/1203

BUSINESS & COMPUTING CONSULTANT

HARROW ENGLAND
MIDDLESEX COMPANY CAR

Our client, a member of a highly successful group in the Leisure Industry, now wishes to appoint a Consultant who will advise Board Level Management upon the potential use of new computing technology within the business activities of the company.

Future projects include the setting up of a Communications Network including Message Switching and developing towards the Electronic Office concept. Whilst specific indepth technical knowledge is not essential, the person appointed must be capable of recruiting people with the necessary expertise to implement such projects.

In addition to being self-motivated a sound awareness of general business principles is considered to be equally important as a good understanding of computing and data processing.

This is a senior Management appointment and will provide a career path to line management in the Group. The commencing salary is negotiable and attractive benefits include a company car.
Ref. NW1/1203

MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4A 3AA Telephone 01-551 0981 24 hours

Consultants (RSTS/E)**Zurich, Luxembourg, Frankfurt c.£16,000+Exps.**

Our client, a Swiss Management Consultancy, with offices in the above locations wish to recruit professionals to strengthen their current project teams involved in the development and installation of banking systems, throughout Europe. Ideal experience would be 3 years Basic + or Basic + 2 in a RSTS/E environment as a senior member of a development team. This being a permanent overseas appointment, candidates must be self-motivated, adaptable and be prepared to travel between project locations when the need arises.

Contact: Brian Postles

Analyst/Programmer**London c.£11,000+ benefits.**

Our client, a well established commercial organisation, a household name, wishes to recruit an Analyst/Programmer to work in the System Support Team which has a responsibility for the efficient and effective running of live applications and the provision of an enquiry facility to the User Departments. Candidates should have around five years experience in an IBM OS environment with a substantial background using PL/I. Knowledge of financial/accounting systems would be an obvious advantage.

Contact: Jim Baker

Consultant**London Quality Assurance to £10,000**

Our client, a very successful consultancy has grown steadily in the extent and complexity of its operations. They are currently seeking a Software Engineer with the experience and ability to make an immediate contribution in a demanding team environment. The QA team works in close co-operation with Project Leaders and therefore have an opportunity to acquire a unique overview of the company's activities. The appointee will play a significant role in the audit and review of technically advanced applications with special reference to Defence projects. Applicants will be able to demonstrate a successful technical background which will include an appreciation of electronic engineering and QA procedures.

Contact: Margaret Stevens

Programmers**City To £10,000**

Our client, a highly reputable British Merchant Bank wish to recruit 2 programmers to join a small team responsible for the introduction and development of a comprehensive range of banking and financial applications. Applicants should have at least 4 years experience in d.p. preferably gained on a Hewlett Packard equipment together with a good working knowledge of COBOL. Familiarity with IMAGE or TOTAL databases is essential. Special preference will be given to candidates with a banking background. Usual banking benefits apply.

Contact: David Hendry

COBOL Programmers**Sussex/Hampshire c.£9,000**

We are in the process of recruiting competent COBOL Programmers, for two of our clients, both well established systems houses. A minimum of three years sound COBOL experience, preferably from an on-line or real-time environment with particular emphasis on ICL ME 29 or 2900 series using DMS. Consideration will be given to candidates with a good COBOL programming background using other hardware. Applications experience should be accounting and financial. Opportunities will exist to progress into analysis but it is essential to have a preference to stay in programming for the immediate future.

Contact: Janet Chivers

Communications Programmers**London c.£8,000**

We have been retained by an international consultancy organisation, who are expanding their development in Videotex systems, to recruit two software programmers to be involved with the exciting application. Applicants should have at least two years' programming experience, preferably with FORTRAN on EDP II or VAX II's in a communications environment. Knowledge of X25 3270, packet/message switching would be an advantage. Ability to work with users with minimal supervision is essential. The job involves colour, business graphics and networking.

Contact: Jim Baker

JAMES BAKER ASSOCIATES
International Personnel Consultants
82 Savile Row, London W1
Tel: 01-438 9311

OPERATIONS

IBM MVS OPERATOR LONDON c.£6,000
Very large transport company require ops with 1 year exp. of MVS JES 2. Good opportunities for promotion which includes possible progression to programming.

IBM OS VS1 SNR. OPERATOR DORSET c.£6,500
Large financial company require operational staff with a min. of 2 years' exp. of OS/VS1 and MVS and CICS. Very good company package includes Mortgage, Life Assurance, Restaurant, Sports and Social etc.

IBM DOS SHIFT LEADER LONDON c.£8,500
This financial company requires an experienced shift leader with experience of USE, VMS and CICS. It is unlikely that this person will be under 25 years' of age. Excellent benefits include mortgage, contributory pension scheme etc.

IBM OS VS2 OPERATOR SURREY c.£6,000
Market leader require exp. operator to work in one of the company centres with T.P. links throughout the U.K. At least 2 years' experience with sound knowledge of OS/VS2, MVS exp. of T.P. system. Scope for promotion and staff shopping facilities.

IBM JES2 SHIFT LEADER LONDON c.£9,000
Large company requires experienced shift leader, good OS JCL a must, plus good JES2. At least 1 year's experience of IBM required. Good benefits and prospects.

IBM SYSTEM 3/15 OPERATORS LONDON c.£5,500
Overseas Bank require experienced operators for their banking system to work 2 shifts. At least 1 year's experience required. All the benefits of a financial company + good prospects.

ICL GII/VMEB OPERATOR c.£5,700
An International Company based in West London requires an operator with minimum of two years' experience operating on a two shift system. Good prospects. Excellent company benefits.

ICL SYSTEM 4 OPERATOR c.£5,900
URGENT! City based financial company requires operator min. 18 months experience. Opportunity to operate new large main frame now being installed. Offer excellent future promotional prospects. Generous company benefits.

ICL GII/DME OPERATOR LONDON c.£5,500
Large machine user has a requirement for an experienced operator with a min. exp. of 1 year on ICL 2956. Very good prospects for promotion and training facilities are excellent.

IBM MVS OPERATORS WORCESTER c.£8,000
Very large industrial user has a number of operator vacancies at their computer centre for MVS JES2 people. Minimum of 18 months experience for these shift only positions.

IBM OS VS1 OPERATORS LONDON c.£6,500
Market leader has opening for OS/VS1 ops for large IBM installation, 1 year's experience minimum for this shift only post. Very good company package includes mortgage, restaurant etc.

Datascene International Limited
168-172 Regent Street,
London W1B 7PS. Tel: 7881

datascene 01-439 7871

FACILITIES MANAGEMENT BUSINESS
CONTRACT STAFF SUPPORT SYSTEMS

HEXAGON

PERMANENT RECRUITMENT DIVISION
requires

1. Senior Recruitment Consultant
(Manager Designate)
Name your Salary? + car

1/2. Recruitment Consultants
Min. 5 Figure Income + car

We need experienced computer professionals (mid-late 20's) with or without a proven sales background. They must be totally self motivated, capable of working with the minimum of supervision, and possess the self determination to succeed in a competitive, fast expanding market, and not afraid of hard work.

In return, we offer:

- A High Income
- Personal Job Fulfillment
- Positive Career Development
- Company Car or Allowance (after probationary period)
- 4 weeks holiday, and other top Company perks.

To apply, in strictest confidence, telephone Fabian Brewster, Managing Director, on 01-434 2714, quoting ref. C/JONE.

HEXAGON
01-439 3571

THORBAR

A DIVISION OF INBUCON MANAGEMENT CONSULTANTS LIMITED

CITY/E.C.1
DATA PROCESSING MANAGER
CIRCA £12,500 PER ANNUM
PLUS: CAR - PROFIT SHARING - MORTGAGE SUBSIDY -
AND MANY OTHER FRINGE BENEFITS

An opportunity has arisen for a well-qualified computer professional to join a subsidiary of a major International Financial Group as Data Processing Manager.

Ideally you will portray the following levels of experience and skill:

1. A sound D.P. background having developed your career from Programming through Systems Analysis and Design and currently occupying a responsible management position.
2. You will have experience of working with sophisticated On-line/Real Time systems preferably related to financially based applications.
3. Familiarity with more than one level of computer mainframe, with particular experience based upon PDP 1170 hardware will prove highly attractive.
4. We would expect you to be experienced in managing D.P. personnel at all levels and to portray the ability to communicate well with user personnel and departments.

THIS IS AN OUTSTANDING OPPORTUNITY FOR A PERSON TO JOIN A FORWARD-LOOKING AND DEVELOPING COMPANY INTERESTED IN TAKING ADVANTAGE OF NEW D.P. TECHNOLOGY AND EXPANDING ITS D.P. FACILITIES FOR THE BENEFIT OF ITS USER DEPARTMENTS. OUR CLIENTS WISH TO MAKE THIS NEW APPOINTMENT BY THE END OF MARCH AND THEREFORE RING US (24-HOUR ANSWERING SERVICE) OR SEND YOUR C.V. NOW WITH A VIEW TO ARRANGING AN EARLY INTERVIEW.

REF: CW/8/81

INBUCON MANAGEMENT CONSULTANTS LIMITED

D.P. Appointments & Contract Personnel,
Greenock House, 19 Cuckfield Road, Hursley,
Sussex BN6 9RP. Telephone: Hursley 0273 833818.

(4766)

INBUCON

Are you interested
in...

Merchant Banking?

- Mortgage subsidy
- Profit sharing by equity participation
- Non-con. pension
- Free life assurance
- LVs
- 20 days holiday
- Free BUPA
- Interest-free season ticket loan

SMF-Data Services provides a full range of computer facilities to one of the City's leading Merchant Banks. They have twin UNIVAC 1100/60's, which will service a network of over 100 micro-computer-based terminals, supporting systems in the fields of Foreign Exchange, Investment Performance, Portfolio Valuations, Loans and Deposits and general banking. SMF also provide turnkey services to clients using Hewlett-Packard 3000 hardware.

Senior Analyst/Programmers
c.£11,000 + benefits City
Minimum of 6 years programming experience required, including COBOL, plus the design and implementation of a major system.

Analyst/Programmers
£7 - £10,000 + benefits City
2-5 years experience is required, including COBOL and the ability to liaise with users.

HP3000 Analyst/Programmer
£8 - £10,000 + benefits City/West End
This Analyst/Programmer will work on client's premises and be involved in all aspects of a project. Programming is in COBOL.

Software Programmer
INTEL micros
£8 - £10,000 + benefits West End
A knowledge of hardware interfacing, as well as Assembler programming, is required for the development of micro-based word and data processing products.

CAPP ASSOCIATES
01-686 9693

Please contact Joan Ainsworth
(24-hour answering) quoting ref: CW108-1A

Capp House, 96 South End, Groydon GR9 3SD
Computer and Professional Personnel Consultants

INBUCON

DEC PDP 11/70 RSX Technical Support. Home Counties.
Honeywell Level 6. Operators. Home Counties.
IBM 4331 DOS VSE Operator. Home Counties.

Honeywell L.6 Operator. City. Days. £6K. A highly profitable organisation with a powerful Level 6 offering on-line facilities requires a second operator to run their day shift. More details regarding this site available from Kay on 01-836 8411. Ref. KS/103/CW.

Senior Operator. S.E. London. £6K. Good RSTS Operator required for dynamic site, to be trained to Shift Leader position, working 3-shift system on PDP 11/70, 35 and 34. Excellent company benefits. Call Mary, 01-836 8411. Ref. MC/99/CW.
RSTS PDP Operator. Central London. To £7K. Good RSTS operator will be well rewarded with high salary, benefits and excellent promotional prospects, if prepared to join lively busy team working 3-shift system on 11/70, 44, 34. Call Mary on 01-836 8411. Ref. MC/104.

CoOperators

68-69 St Martins Lane
London WC2N 4JS
Telephone 836 8411

VUGROUP
Recruiting for clients

Nantwich

Serving the North & Midlands
OCC Computer Personnel
5 Hospital St. Nantwich Cheshire
0270 627 206

DOS/VS Operator
Switzerland

to £8,000
tax free

Our client, an international bank in Switzerland, urgently needs a single young (22-25) IBM Operator with experience of DOS/VS or VSE. The present IBM 370/148 is to be upgraded to a 4341 later this year. Initial one-year contract. Ref: 12/1 Olga Penn.

PDP 11 Senior Systems Programmer
Belgium

to £18,000

A multinational company and a leader in the field of instrumentation and advanced distributed control systems seeks a Senior Systems Programmer/Team Leader with at least 5 years' experience. In-depth knowledge of DEC PDP 11 with RSX 11M is required plus one high-level and one assembler level language, to be based at its European systems centre. Ref: 12/2 Brian Harris.

Senior Systems Analyst
Manchester

to £9,000

A Senior Systems Analyst is required to lead a small team of Programmers and Analysts to develop the accountancy system. Good solid experience in any hardware environment is required. Background in accountancy is highly desirable. Prospects of career development. Assistance with relocation. Ref: 12/3 Olga Penn.

Honeywell Systems
Brussels

to £18,000

A well-known multinational with its European headquarters in the Belgian capital wishes to recruit a number of Honeywell specialists, particularly those with exposure to Level 6, L66 and TDS/IDS software for permanent placement at a new R & D division specialising in production control packages. Ref: 12/4 Brian Harris.

Programmer Analysts
RhineLand

c £13,000

A multinational manufacturing organisation based in an attractive part of Germany wishes to recruit two Programmer Analysts to work on manufacturing systems on their IBM 4341. Candidates should ideally be graduates with experience in some of the following areas: PL1, COBOL, ASSEMBLER, GIC, COFICS, KAPOSS. Candidates must be prepared to learn German. Ref: 12/5 Neville John.

DISTRIBUTED SYSTEMS LIMITED

RECRUITMENT DIVISION

PERMANENT
ICL 2904 OPERATOR for commodity brokers in City. Experienced Operator. £8,000+. Ref. 81/24
Trainee or Junior, 6 months' exp. £4,000+. Ref. 81/25
NCR 8455 OPERATOR S. London. £4,500 neg. LVs, house loan. Ref. 81/26

PROJECT LEADER SYSTEMS ANALYST for manufacturing company in Surrey. On-line exp. essential. IBM System 34 or 3/15 preferable. RPG background desirable. Ref. 81/27

ANALYST/PROGRAMMER for manufacturing company in Surrey. RPG exp. on System 34 essential. Manufacturing exp. incl. MAAPICS desirable. Ref. 81/28

SENIOR TECHNICAL PROGRAMMER for DEC 11/70 commercial installation in City. RSTS and BASIC + 2 exp. essential. RMS exp. desirable. To maintain and tune RSTS system, maintain programming standards, and work on application project teams. £9,000+, LVs 65p. Ref. 81/29

DATABASE ADMINISTRATOR for major financial institution. MSP DATA MANAGER exp. essential. Competitive salary plus exceptional benefits. (Contractor considered). Ref. 81/30

JUNIOR ANALYST/PROGRAMMER for City bank. Banking exp. desirable, particularly DEC/BASIC. AIMS exp. especially valuable. £8,000. Ref. 81/31

PROGRAMMER COBOL on HP 3000 exp. advantageous. Banking exp. desirable. City. Up to £10,000. Ref. 81/34

CONTRACT
ANALYST/PROGRAMMER ICL 2903/4 Applications Manager exp. essential. 3-6 months' assignment. Ref. 81/32

PROJECT MANAGER with significant exp. of foreign exchange systems for 18-month prestigious assignment leading large team in FLORIDA. Second vacancy for TEAM LEADER. Accommodation and expenses paid. Ref. 81/33

Licensed in accordance with Employment Agencies Act 1973 (S.8) 1559
70 Borough High Street, London SE1 1XF
Tel: 01-403 3456 & 1568 24-Hour Answerphone

KEY OPERATIONS ASSISTANCE LTD.

IBM OPERATIONS MANAGER

c £13,000+

A leading concern based in Central London currently require an individual with initiative to advise on and implement a new organisational structure within their expanding computer installation. Currently based on large IBM 370 hardware, a conversion to IBM 4341's with an IMS-Database facility is planned for mid '81. It is necessary for candidates to have already gained management experience in a customer orientated environment, possess excellent inter-personnel communication skills and have had exposure to database usage, preferably IMS. This position provides an unequalled career opportunity to be involved in an international organisation with worldwide commitments. A comprehensive benefit package, which includes mortgage subsidy, is offered together with an excellent negotiable salary.

IBM SHIFT LEADER

c £9,700+

A progressive financial concern situated in Central London require a highly motivated individual to supervise the efficient running of a shift. The company rely heavily on their computer facilities to provide up-to-date information regarding worldwide finance transactions and are therefore committed to keeping abreast of technical developments and maintaining a highly professional computer team. Candidates must have a minimum of 4 years' IBM experience with a thorough knowledge of DOS/VS, POWER/VS, associated utilities and JCL, CICS and VTAM. In addition to the excellent salary, the company offer mortgage subsidy and life assurance. This position is worked on a two-shift system covering 07.30-22.30, Monday to Friday. For more information on the above and other IBM vacancies - technical and management - please ring JANET WARREN. All enquiries are treated confidentially. KEY OPERATIONS ASSISTANCE LIMITED 27 NOEL STREET, LONDON, W.1. 01-499 7651

FOR
CLASSIFIED

ADVERTISING USE

DIRECT LINE

01-661 0121

BANKING ANALYSTS
INSURANCE ANALYSTS £400 wk

For City and Surrey
for 6 months to 1 year contracts

Systems Supervisor, Mini-Computer West London

We are a major company involved in construction for the Oil, Gas and Chemical industries. There is an immediate requirement for a Supervisor for a Meijer Mini-Computer System. He or she will be assisted by Data Operators and be responsible for the total system, including Planning, Field Cost Reports, Drawing Quantity Control and Budget Estimating. Periodic visits to sites in the U.K. will be necessary to ensure the smooth operation of the system. The successful candidate will be at least 24 years old, preferably of Higher National standard in Computer or Business Studies, and must know basic computer language. This is a permanent position with a competitive salary and attractive fringe benefits. Please write giving full particulars to John Jones, The Ralph M. Parsons Co. Ltd., Kew Bridge House, Kew Bridge Road, Brentford, Middlesex. TW8 0EH. Telephone 01-866 3081.

PARSONS

The Ralph M. Parsons Company Limited

INCREASE YOUR SCOPE - Join an expanding company

Analyst Programmers

£9-13000 p.a.
plus extensive benefits

Our client is a major computer services company, well established, and very successful.

Continuing expansion has created a need for several more Analyst Programmers/Consultants, with commercial, general financial, or accounting systems experience.

The job is varied, and further experience and training will be continually forthcoming.

They seek

- ★ some analysis experience/ability
- ★ COBOL programming
- ★ an appreciation of commerce
- ★ a desire for customer satisfaction
- ★ flexibility and mobility

They can offer

- ★ 'Top ten' salaries
- ★ variety of work, experience and responsibility
- ★ non-contributory pension and other benefits
- ★ profit share and share purchase schemes
- ★ RELOCATION help if necessary

To learn more of these excellent opportunities based in NORTH EAST SURREY, contact Derek Pearson now, quoting 844P and arrange an instant interview.



ZEUS-HERMES RECRUITMENT

TELEPHONE: 01388 5011 (24 HOUR SERVICE) OR WRITE:
(NO STAMP REQUIRED) ZEUS-HERMES RECRUITMENT LTD
FREEPOST 20 LONDON W1E 4YZ



CONSULTANTS and SENIOR ANALYSTS ENERGY SYSTEMS

Oil and other energy-related industries are renowned for the development and use of new technology and are now among the largest computer users with specialised and complex applications requirements. Our client is a leading systems house (700 staff) which is a major supplier of consultancy services and computer systems to the oil, gas and petrochemical industries. The combination of two growth areas, computing and energy, has led to a significant planned expansion for 1981 within the Energy Systems Division resulting in the following career opportunities:

CONSULTANTS

FROM £12,000

We expect you to have about eight years' D.P. experience, including project management, the preparation of strategic studies, and the design and implementation of commercial systems based on minis and mainframes working in an on-line environment. Experience of database techniques, communications, or the energy field would be useful. Mobility is highly desirable as opportunities may exist for overseas and U.K. travel.

SENIOR ANALYSTS/ PROJECT LEADERS

£9,000-£11,500

You should have at least four years' D.P. experience including team leading, analysis, design and implementation of on-line/database systems. Your software background should be in high level languages (e.g. COBOL, PASCAL, FORTRAN); preferred hardware is HP, DEC, IBM and DG. Again, a certain amount of mobility is required.

These London-based positions offer a challenging career on a variety of projects, working in a professional environment, with client contact and the opportunity of overseas travel. Initiative and commitment are encouraged and rewarded appropriately.

For further information, please contact MARK TRENS quoting reference CW 1203.

(4814)

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE
HUTTON STREET, LONDON EC5T 8HA
TELEPHONE: 01-353 7741 (24 HOURS)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

Targa

SYSTEMS ENGINEER

CITY
A superb opportunity to join a flourishing BANK in the City. It is essential that the successful applicant has the maturity and ability to cope with a range of duties which include generating Operating Systems, Database and applications support, troubleshooting and software enhancement. Definite prerequisites are extensive knowledge of COBOL gained in a VS environment, whilst a background which includes DOS/VSE, POWER and CICS would be advantageous. The usual BANKING BENEFITS including MORTGAGE SUBSIDY apply.
Ref: R3274

ANALYSTS

CITY
Due to continued expansion, a large ICL installation have vacancies for experienced SYSTEMS ANALYSTS. Applicants must have a formal background which includes one or more of the following application areas - Finance, Admin, or Operation Research. The prime programming languages are COBOL and FORTRAN. An excellent range of benefits is offered, together with a secure career offering plenty of scope for personal advancement.
Ref: R3265

OPERATIONS SUPPORT

IBM MVS
A large well-known company with twin IBM 3032 mainframes have a requirement for two people to supplement their existing Operations Support team. A SENIOR person with approximately 3 or 4 years' good experience of MVS gained within an Operations or Technical Support area on medium to large IBM systems, and a Junior who has good knowledge of MVS gained possibly as a Shift Leader are the vacancies currently available. DAYS ONLY position with excellent company perks.
Ref: 2639

SENIOR OPERATOR

IBM MVS
An International Manufacturing Company requires an experienced Operator for their large multi-machine computer centre. A minimum of 2 years' experience on medium to large IBM systems with knowledge of Teleprocessing and Real-Time systems is a pre-requisite for the position. A three shift system is currently in operation with voluntary overtime at weekends. Company benefits include staff shop and free meals on shift. Site based in South London.
Ref: 2277

OPERATOR

ICL
A Computer Site based in London has a requirement for an Operator to work on their 2858 configuration. 2 years' G11 experience is required for this position and a knowledge of DME2 would be an advantage. This vacancy would suit an applicant who is prepared to work under a 3-shift system covering Monday to Friday.
Ref: 3295

OPERATOR

ICL
A Hertfordshire Engineering Company has a vacancy within the Computer Department for an Operator. The applicant must have 1 year's EXCELS experience and be prepared to work a three shift system.
Ref: C3271

TARGA COMPUTER SERVICES

6 Liverpool Street, London EC2M 7NH 24-hour Ansaphone 01-283 9941

PROGRAMMER/ANALYST

WEST END
An interesting vacancy has occurred for a person with 2-3 year's COBOL programming experience, together with a small amount of analysis. This company is an expanding user of IBM equipment and from the applicants point of view a knowledge of CICS and/or TOTAL database would be particularly advantageous. Interesting applications and good fringe benefits are offered.
Ref: R3233

PROGRAMMER

GREATER LONDON
An ICL user in Greater London are seeking an experienced Cobol Programmer. A minimum of three years' experience is required, preferably to include financial and real-time applications. This is an excellent opportunity in a progressive installation offering good scope for advancement and first-class conditions of employment.
Ref: R3166

PROGRAMMERS

CITY
A minimum of one year's BASIC+ 2 experience in a RSTSE or RSX11M+ environment is required for two of our city-based clients. Both financial institutions, they offer secure positions in development teams together with outstanding opportunities to progress and excellent benefits.
Ref: R3179

SHIFT LEADERS

HONEYWELL
A well-known manufacturing company based West of London requires Shift Leaders with a minimum of 18 months' experience of Honeywell mainframes or minis using GCOS. A knowledge of LEVEL 6 would be an added advantage but not essential. Excellent company benefits are provided and opportunities exist for some overtime.
Ref: 3284

TECHNICAL SUPPORT & SHIFT CONTROLLER

VME/B
A large site based in the South have a requirement for a Technical Support Specialist and also a Shift Controller. The experience required for the Technical Support Specialist is 2 years' VME/B plus good SUPERVISORY SKILLS. The successful applicant will be reporting to the Technical Support Manager and must be able to maintain VME/B at Software level and also be responsible for the enhancement of the system. This is a DAYS ONLY position. The experience required for a Shift Controller is a minimum of 18 months' VME/B plus a knowledge of SCL and MACRO's. The applicant must also have 6 months' Supervisory experience and knowledge of 1800 Hardware using G11. A standard 3-shift system is in operation.
Ref: 3283

OPERATOR

BURROUGHS
A company based in Oxford has a requirement for a Senior Operator for their 8800 machine. The successful applicant will join a small friendly team and be expected to perform tasks ranging from routine Data-entry to deputising for the Operations Controller. Burroughs experience is NOT ESSENTIAL but is obviously useful. This is a DAYS ONLY position.
Ref: 3270

COMPUTER ADVISOR
ARABIAN GULF

A prestigious Arab financial institution seeks a Computer Advisor for a two-year contract. The position demands a mature professional with at least eight years' On-Line systems leadership and preferably with working knowledge of the Middle East. The Computer Section is small and of high quality; it is intended that it should remain so. A twin CPU Tandem installation is in operation. The successful candidate will help to accelerate the professional development of this team.

Responsibilities will include—Detailed guidance in establishing on-line design concepts.
—Leadership of systems software function.
—Demonstrated record of on-line technical leadership. (Emphasis T.P. monitor and database.)
—Two years' systems experience in a financial institution. (Emphasis data security and audit.)
—Recent working experience of Tandem systems. (Emphasis Guardian, Pathway, Enscribe and Enform.)

Salary (tax free) and benefits will be substantial. Initial interviews will be in the first half of April. Resumes in confidence to Box No. 1134.

TRAFFORD METROPOLITAN BOROUGH
BOROUGH TREASURER'S DEPARTMENTPROJECT LEADER
PO1 (6-10) £9,576 - £10,731

The Project Leader will be involved in implementing the Council's plans for expanding computer usage throughout its departments on financial and non-financial applications operated both batch and on-line. New development will exploit the bank of on-line data made available by using DAPUS 11 as a database manager with remote access by terminals. The Project Leader will be expected to take a leading role in ensuring that targets and objectives are achieved. Experience in local government whilst advantageous, is not essential, but a number of years' experience in systems analysis is vital and database experience would be welcome.

SYSTEMS PROGRAMMER
PO1 (2-6) - £8,631 - £9,576

The newly created post of Systems Programmer will call for at least 3 years' systems programming experience. Knowledge of MVS or OS/VS1 would be a considerable advantage as would an in-depth knowledge of at least three of the following: BAL, CICS, VSAM, DB/DC, and VM. Knowledge of data base language useful.
The Council operates a 4 megabyte IBM 3031 currently running under VM, DB/VS1 with consideration being given to rapid development through PDS/VS2 to MVS. The present network of 38 terminals will be increased by 100 during the next 2 years.
Application forms and further information from Miss S. Dawson, Tel. 091-980 0141, ext. 262.
Application forms returnable to the Borough Treasurer, P.O. Box 96, Winton House, 2927 Watney Road, Sole, Cheshire SK5 7AL, by 28th March 1981.

Soilax SWINDON
ENEGANALYST/
PROGRAMMER

We are the UK's largest of an International Group specialising in the development of systems for a wide range of public and private sector organisations. We have a long established reputation for the design, development and implementation of systems in a wide range of applications including: Finance, Marketing, Production, Distribution, and Customer Services. We are currently seeking experienced Analysts and Programmers to join our team. The successful candidate will be responsible for the analysis, design, development and testing of systems. We offer a competitive salary and benefits package. If you are interested, please send your CV to: Mr. G. G. Jones, Director of Personnel, Soilax Limited, 100, The Quadrant, Swindon, Wiltshire SN1 1JN. Tel: 0493 40114.

PETERBOROUGH CITY COUNCIL
SYSTEMS ANALYST
SO.1 £7832-£8139

Applications are invited for the above post from personnel with previous systems experience. Knowledge of TP systems should be an advantage although not essential.
Systems will be developed on an ICL ME28 Computer utilizing Database and Data Dictionary.
The Council operates a system of flexible working hours around a 37-hour week and provides in appropriate cases:
* Actual relocation expenses incurred in House purchase/rent and removal, a disturbance grant of £100.
* Housing accommodation or lodging allowance.
Further details and application form (returnable by March 30, 1981) available from City Treasurer, P.O. Box 5, Town Hall, Bedford Street, Peterborough PE1 1HQ. Telephone No. (0753) 62141, Extension 525.

CONTRACT
CICS PL1 ANAL PROGRAMMERS
IMS DV/DC/ADF ANAL PROGRAMMERS

Starting April, May, June, London, Home Counties and Sussex.

A unique opportunity in
Computer Graphics

A well-established U.K. Computer Graphics Manufacturer is pioneering a new display technology, and is looking for a Computer Graphics Software Expert to contribute to this development.

If you have the necessary knowledge and background in Computer Graphics Software, and the drive and management experience to help us make a commercial success of this venture, then we would like to hear from you.

If we think you measure up to the task, we will be pleased to discuss the project with you. The reward will be commensurate with the opportunity.

Write to Box No. 1135

PL/1 MK IV IMS DB/DC COBOL CICS

ANALYSTS
PROGRAMMERS

Whatever your background...

If you're an ambitious Systems Designer, Analyst/Programmer or Programmer with a sound background on IBM equipment and experience in one or more of the areas shown above, we can offer you a very rewarding future.
We're Informatics — a major force in the world of data processing and a respected innovator in the design and development of sophisticated computer systems. Our client list includes some of the biggest names in Commerce and Industry today. Now, the increased demand for our services throughout the UK and Europe means we're looking for a number of experienced men and women like you to join our fast moving organisation.

With Informatics, you'll become an important member of a small integrated team of professionals who enjoy real responsibility on a wide variety of challenging software projects. That's why you'll need a high degree of self motivation and flexibility together with first class communicative skills and a creative approach to solving software problems. With Informatics, you can look forward to exceptional rewards.
If you're working on UK projects, you'll enjoy an initial salary of up to £15,000 p.a., whilst those who work on projects throughout Europe will enjoy a salary package of up to £25,000 p.a. Either way, you'll appreciate a full range of fringe benefits which includes generous business expenses. And in terms of your future, if you've the potential, we have the opportunities for career success.
So if you're looking for better rewards for your hard earned experience, join the team at Informatics. To arrange an immediate interview, make a reverse charge call to Barbara Bechtloff on 01-405 8546. Or write, with full personal and career details, to her at: Informatics Consulting Ltd., Africa House, 64-78 Kingsway, London WC2B 6AL.

...we can offer you a
more rewarding future
£15,000 pa in the UK
£25,000 pa in Europe

informatics
consulting ltd.
01-405-8546

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611
9 a.m.-6 p.m.

SALES PEOPLE

BASIC £9K

c £17K + Car

DATA COMMUNICATIONS SOLUTION SELLING

We have been retained to identify and select a data communications hardware sales professional to spearhead our clients drive into the market in the South-East.

Our client is a division of a major organisation supplying computer based telecommunications and message switching systems to prestigious companies both in the U.K. and world-wide.

The division has an excellent range of modems statistical multiplexors, terminals and associated products that will have their own dedicated engineering and technical support teams.

If you have successfully sold data comms, enjoy working in a friendly team environment and want the financial and progressive career opportunities that this position offers, contact Tony McGrath for a confidential discussion and immediate interview on 01-637 9611.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637-9611

MANAGEMENT & EXECUTIVE SELECTION

CABLE AND WIRELESS U.K. SERVICES LIMITED

Cable and Wireless U.K. Services Limited, a subsidiary of the International Cable and Wireless Group is skilled in the design, installation and maintenance of Telecommunications and Data Processing Systems. Currently we are turnkeying commercial Data General Mini-Computer Equipment, utilising inventory control and financial software packages, to a wide range of clients with varying applications. We have also established a sophisticated communications product range including the most up-to-date switching systems and IBM compatible remote batch and interactive terminals. These developments together with our aggressive marketing policy created vacancies for ambitious sales and sales support staff to contribute to our further expansion and share the benefits of our success.

Sales Executives

Selling our range of Mini Computer Systems calls for specialised hardware sales experience and a proven record of success in this field. In return we can offer a competitive basic salary, company car and generous commission with no upper earnings limit. These are senior positions and you will be expected to make a real contribution to the policy and growth of the department.

Support Engineers

We are looking for communications specialists capable of providing pre- and post-sales support to our technically competent sales force. Specifically, you will need in-depth knowledge of message switching software and hardware and hands on experience of DEC PDP 11/VAX operating under RSX11/VMS using BLISS/MACRO, OR or fully experienced in the application of bit oriented protocols as used by IBM, and packet switching networks. Salaries will be negotiable with an attractive package for the right people. All these appointments are open to men or women and successful candidates can expect good promotion prospects, a salary which will fully reflect their skills, and the many other benefits associated with a modern Company in the forefront of technology. To apply please contact: Susan Darby, Cable & Wireless U.K. Services Ltd., 43 Blackfriars Road, London SE1 8HQ. Tel: 01-433 9677.

SYSTEMS ANALYST

We require a professional Systems Analyst (male or female) who can take responsibility for developing major computer systems. Applicants must have at least 2 years' system experience preferably on ICL 1900 or 2900 machines. We offer modern air-conditioned offices near Trent Bridge Cricket Ground, and variable working hours according to the County Council's Scheme. This is one of the cheapest priced housing areas in the country and has excellent shopping, schooling and shopping facilities. For further details and an application form please send your CV to: Mr. John Hargreaves, Systems Analyst, Trent Bridge Cricket Ground, Trent Bridge, Nottingham NG2 6ES. Tel: 0533 7955. Write to the Director of Planning & Development, Trent Bridge Cricket Ground, Trent Bridge, Nottingham NG2 6ES. Closing date 23 March 1987. (4028)

DEPARTMENT OF COMPUTER SCIENCE University College London

The Department of Computer Science has several vacancies for: **RESEARCH ASSISTANTS** and **TECHNICAL OFFICERS**. The positions are supported and are suitable for 2-4 years. The research is in the field of Computer Networks, Control, and the design and development of computer systems. There are positions for Technical Officers, providing application programming, system administration, and the physical design of computer systems. For further details and an application form please contact: Mr. J. Hargreaves, Department of Computer Science, University College London, Gower Street, London WC1E 6BT. Tel: 01-253 5336. Closing date 23 March 1987. (4029)

COMPUTER FINANCING INTERNATIONAL LIMITED

Telephone 01-491 4153 or 01-499 7955
Telex 8954724

REQUIRE SALES EXECUTIVE £20,000 PLUS

We are a young dynamic and very professional company dealing in the Leasing and Brokerage of new and used IBM computers and peripherals. We are currently looking for a Sales Executive who will be required to call upon IBM users throughout the UK and with some European Responsibilities you will report to the Sales Director.

Basic Qualifications: Enthusiasm, ability, self-motivation and above all someone who's not afraid of hard work. Knowledge of IBM computers and peripherals is desirable.

A second language is useful, as we are an international company and some overseas travel may be inevitable.

Rewards: Good basic salary plus high commission should generate earnings in excess of £20,000 per annum. Company car available. Excellent working conditions and all the usual benefits associated with a young company.

Interested parties should contact Stephen J. Measures Sales Director.

Standbrook House
25 Old Broad Street, London EC1A 3TB

COMPUTER FINANCING INTERNATIONAL LIMITED

Telephone: 01-491 4153 or 01-499 7955
Telex: 8954724

MULTI-PROCESSORS

£8,000-£11,000

Bournemouth

Systems Programmers

Benefits

Relocation Package • Mortgage Subsidy Scheme • Free Pension and Life Assurance • Career Development and Training • Subsidised Restaurant • Staff Discount Shop • Sports & Social Club

We are currently a single CPU OS/VSI installation using CICS VS and BTAM, converting to dual CPUs, MVS/SP JES2, ACF/TAM and ACF/NCP. Other products supported by the group include COBOL/VS FORTRAN H Extended, LIBRARIAN (batch and on-line), DATAMANAGER, TESTMANAGER and SDF/CICS. Additional staff are required to help us complete these tasks and support an ongoing expansion.

If you have 2 years experience of installing and maintaining IBM operating systems and associated packages, and Assembler programming please write or telephone for an application form to: Tom Consterdine on Bournemouth (0202) 292373 ext. 4444

Or for further details ring:

Bob Freeth on Christchurch (0202) 47741 ext. 59 (Days)
or New Milton (0425) 618092 (Evenings)



Abbey Life

Abbey Life Assurance Co. Ltd.,
Abbey Life House,
80, Holdenhurst Road,
Bournemouth, BH8 8AL.

MVS SNA CICS

A career opportunity for Computer Operations Staff Up to £9,226 including allowances

We require a Shift Supervisor, Senior Operator or Operator to join our two-shift Operating/Control Team. Working within a Career Graded Structure, where progression is based on the merit of the individual, there are opportunities to become an Operations Analyst, or for those with suitable aptitude a chance to join our Systems Development Department. With the imminent delivery of an IBM 4341 to run alongside our IBM 370/138, we are looking for someone who has two years' operating experience coupled with a sound knowledge of DOS, POWER/VS or VSE, CICS, VSAM, JCL and IBM utilities, who is prepared to make a positive contribution in a progressive but demanding environment.

Contact Allen Chambers on 01-303 7777, extn. 782 or write to the Data Services Officer, Data Processing Department, 9 Brampton Road, Bexleyheath, Kent DA7 2EZ for further details and an application form. Closing date 30.3.87. (4187)

Bexley London Borough

SENIOR PROGRAMMER

c. £7,800

Northampton

Rockware Glass is an established leader in the packaging industry with a turnover in excess of £100 million. The Company's four UK operating sites are connected to two ICL 2950's based at our modern Head Office at Northampton. VME-K has just been installed to aid the development of new TP and Batch systems.

Candidates should be in their mid-20's and have:

- ★ At least 4 years' COBOL experience within a commercial environment.
- ★ Experience of ICL Software.
- ★ A level education or equivalent.

For the right person there will be opportunities for future promotion and excellent career development in this expanding data processing division.

If you feel that you have the right experience, please write or telephone David Shilton, Rockware Glass Limited, Riverside House, Bedford Road, Northampton. Tel: 0604 21255.

ROCKWARE

TRINIDAD NATIONAL SOFTWARE ENGINEER

... to join CCS, a member of the Neal and Massey Group of Companies. A national of Trinidad and Tobago, you must have at least three years' experience on NCR operating systems including VAX, Transpro, Transquest, total database and on-line By-synch communications Protocol. Please write, in confidence, to: Personnel Manager, Complete Computer Systems Limited, P.O. Box 644, Port of Spain, Trinidad. (4018)

UPDATE YOUR PROGRAMMING SKILLS

DEVELOP MORE EFFECTIVE TECHNIQUES USING PASCAL AS A MODEL. Dates 7-10 April 1987. For further details contact Lynn Jones, Centre for Continuing Studies, University of Technology, Loughborough, Leics. L11 3TU. Telephone 0509 6171, Ext. 213. (4028)

CONTRACTS £540 p.w. SOFTWARE ENGINEERS: Southern Italy - 6 months-2 years EASTERN BUSINESS SYSTEMS Tel: 0279-51897 24-hour (4778)

INTERVIEWER

CIRCA £10K for Expanding Specialist Computer Agency, E.C.4 Will train experienced Programmer Ring 3535646 (4778)

FOR

CLASSIFIED ADVERTISING USE

DIRECT LINE 01-661 0121

Recruitment



In Informatics

Communications Software

Southern Germany: Salary to £15K

Communications Engineers from Programmer/Analyst to Team Leader level are urgently required by one of Europe's leading suppliers of communications equipment. Software Development teams, based in their R & D Headquarters, are currently engaged in the design and construction of an advanced telephony system based on Intel 8086 microprocessors. All applicants must possess at least two years' real-time software development experience on any leading mini or

micro-computer and be fluent in one high-level problem-orientated language such as PASCAL, CORAL or RTL2. For the more senior positions it is also necessary to be familiar with an Assembler language and be capable of supervising a small team of Programmers and Analysts. Initial interviews will be held in London and those who are successful will be invited to the Company's premises prior to offers of employment being made. Ref: L/11A

Office Automation

Central London: Salary to £10K

A market leader in the areas of office automation and information science technology requires additional Programmers to join its Software Development team. Suitable candidates will be graduates with a minimum of two years' Assembler, Pascal or Basic Programming experience. It is essential that you have had exposure to either mini computers or

micro-processors and preferably have a knowledge of Networking, Packet Switching or Communications. You will work as a member of a small project team developing State-of-the-Art software with particular emphasis on electronic mailing, text and word processing. Ref: L/11A

Technical & Commercial S/W

E.E.C.: Pkg. to £16K

Technical and Commercial Software Specialists are urgently sought by a leading Dutch Systems and Software House. Applicants with a commercial background will be required to have at least 3 years' programming experience in Assembler, Basic or PL/I on small business interactive systems. Of special interest will be candidates with exposure to

established Structured Programming techniques. Technically-orientated applicants will be expected to possess expertise in Communications Networks, Message Switching or Process Control systems development. Ancillary benefits are excellent and successful applicants will be offered full relocation assistance. Ref: L/11C

Consultants

Central London: Salary to £13K

An International Consultancy that has specialised in computers for over 20 years is now seeking additional Consultants to join its Central London Office. Suitable applicants will be graduates aged 28-32 years and will probably be currently employed by a Systems and Software House or Computer Manufacturer. You should have an understanding of problems from both a business and technical

point of view and have experience of Strategic Planning, Computer Systems Implementation, Operations Research or Product and Market Planning. Of particular interest will be candidates who have worked with Real-Time Systems and have experience in the fields of Telecommunications, Office Automation, Data Base Management or Distributed Processing. Ref: L/11D

Message Switching

Home Counties: Salaries to £13K

Senior Programmer/Designers are urgently required by a leading supplier of data and office communications equipment. Candidates should offer 3-5 years' Assembler or RTL2 programming experience in communications and networking environments. Of particular interest will be respondents with an appreciation of the design concepts underlying "Cambridge-Ring" type systems. Whilst there is a preference for applicants who have worked on PDP 11 mini-computers or leading micro-processors, particular hardware experience is not of paramount importance. Ref: L/11E

Software Support

W. Home Counties: Salary to £13K

A leading Total Systems Supplier requires additional Analyst/Programmers and Project Leaders to join their Customer Support or Software Development team. Suitable applicants will have good personal communication skills and the ability to identify and solve client problems. It is essential for all positions that you offer at least 12 months' experience of

analysing commercial systems. Additionally, you should be fluent in Assembler, Basic + or COBOL, and have recent exposure to mini or micro computers. Candidates who have actual or potential management abilities will of course be considered for the more senior positions. Ref: L/11F

Process Control Programmers

N. Home Counties/EEC: Salary to £12K

Our client is one of the world leaders in the supply of Industrial Process Control Systems. Planned expansion for 1981 has produced vacancies for additional real-time Programmers to join teams engaged in the design and development of software from product planning to live running. Suitable applicants will have

at least one year's experience in either Assembler, Fortran or Pascal in a mini-computer or micro-processor environment. Those who have worked with a manufacturer or who have exposure to Kent, Farnborough or Farnham based systems will be of particular interest. Ref: L/11G

Logistix, 10 Grenville Place London SW7 4RW

01-373 3063



Telex: 28800

Ref: L/11H

CONTRACTS

SENIOR ANALYSTS ANALYSTS & PROGRAMMERS

LONDON & HOME COUNTIES

- ★ ICL 2900 VME/B WITH TPMS, IDMS USEFUL
- ★ HP 3000 MPE IMAGE COBOL
- ★ HP 3000 MPE IMAGE BASIC
- ★ COBOL PROGRAMMERS WITH J.S.P.
- ★ IBM OS JCL PL1 MARK IV IMS
- ★ IBM RAMIS ROSCOE JCL IMS & MARK IV

SAUDI ARABIA

- ★ IBM OS JCL PL1 IMS, MARK IV USEFUL

Please reply A.S.A.P. to:
ALLAN ALEXANDER 01-622 2445, office hours
or 01-686 7242

harris baldry consultants limited

D.O.E. Licence No. SEBU 1515
101a Clepham High Street, London SW4 7TB

IMMEDIATE CONTRACTS FOR PROGRAMMERS

MIDDLE EAST PL1		£20,000 + all expenses
IBM SYS 34 RPG II	Croydon/ London	Neg.
DEC PDP Fortran IV	Croydon	Neg.
DEC PDP Dihol CTS300	Liverpool	Neg.
DEC PDP Basic + RSTS	Surry	Neg.



For further details please contact

**NIC POLAND
TYLIN PEOPLE**

A division of Tylin Management Systems Limited
Leon House, High Street, Croydon, CR9 3NH
01-680 2323

A member of the TATE & LYLE GROUP

Members of
Computing
Services
Association

(4707)

MANAGEMENT & EXECUTIVE SELECTION

COMPUTER WEEKLY, March 12, 1981

telephone 01-637 9611
9 a.m.-6 p.m.

SALES MANAGER

Computer output to micro film

● South East England

Due to internal promotion, our client, a very profitable division of a multi-million pound organisation, has retained us to identify and select a Sales Manager for its COM bureau.

The service they offer is impeccable and they jealously guard their reputation for supplying quality and innovative products. In 1981 they are confidently expecting to maintain their recent high growth rate in revenue turnover.

As Sales Manager your responsibilities will include the management of a small sales force selling both services and hardware in an account development and new business role. As a member of a management team you will have full budgetary control for the sales operation.

The remuneration package is commensurate with the importance of this position but naturally will include a 2 litre company car, pension and life assurance packages.

For a confidential discussion and initial interview contact Tony McGrath on 01-637 9611

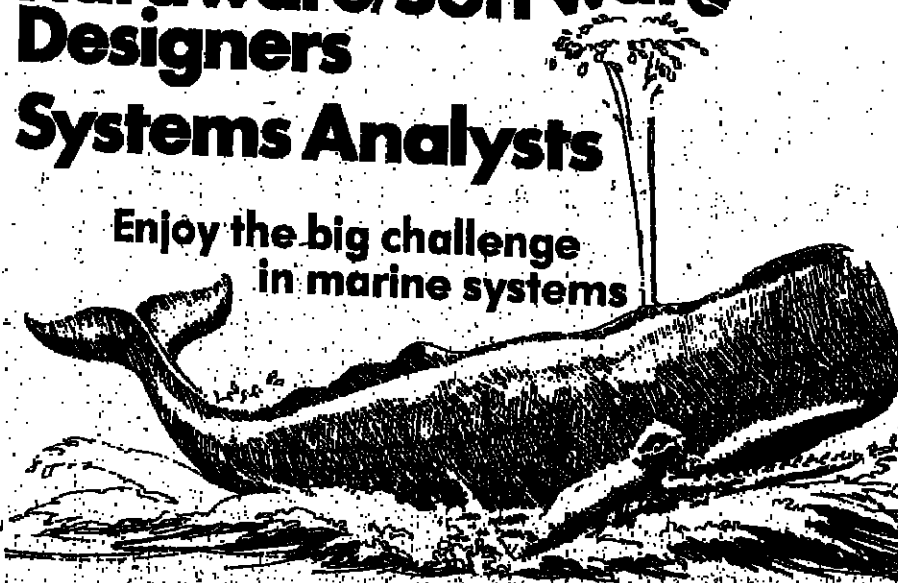
Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637-9611

MANAGEMENT &
EXECUTIVE SELECTION

(4707)

Hardware/Software Designers Systems Analysts

Enjoy the big challenge
in marine systems



Johnnie 1-170

The illustration has nothing to do with having a whale of a time with Plessey. We take that for granted.

The message is all about marine systems development - a fascinating business and of supreme importance.

If you are looking for a stimulating challenge, we want to talk to you about joining a first rate team of professional designers distributed mind and microprocessor controlled real time systems for marine applications.

If you have 3-10 years' experience as a systems analyst or hardware/software engineer able to determine the right balance of hardware and software to make a viable system, then we can offer you a worthwhile career at the forefront of technology. The challenge is in the hardware and software design & development of microprocessor and microprogrammable based systems using the latest LSI technology and software engineering techniques.

You should have relevant experience in real time systems such as defence, message switching, communications, signal processing or related applications. Ideally you are experienced in RISC1M, Coral 66 or Mesoc, as well as in microprocessor interface and programmable hardware. Plessey is a picturesque village in the heart of Somerset, yet close to Bournemouth and several large towns. Salaries will be into five figures and an excellent relocation package will make the going easy. To discuss the matter in confidence, send me a brief or write giving brief details to Robin Churchill, Technical Recruitment Manager, quoting ref TCR/104 at Plessey Marine Research Unit, Millbrook House, Templecombe, Somerset. Tel: Templecombe (0883) 74561.

PLESSEY
electronic systems

CANADA DATA PROCESSING PROFESSIONALS

opportunities in the province of ALBERTA

OUR ORGANISATION

Alberta Government Services, Information Services Division is the central Data Processing facility for the Government of the province of Alberta. Computing Services include the operation and support of one of the largest computer centres in Western Canada. Systems Services include new development and maintenance activities associated with the challenging applications of our clients.

Our Computing Centres operate two IBM 3033's, one IBM 3031 and two IBM 370/168's under MVS/JES2. The configurations support a network of more than 800 terminals throughout the province. Software includes COBOL, Mark IV, Librarian, CICS, TOTAL, Envision 1, ADABAS, IDMS and Roscoe.

OUR REQUIREMENTS

If you have technical or applications systems/programming experience, we invite you to consider one of our challenging positions as an Intermediate or Senior Analyst, or Project Manager in our progressive organization located in Edmonton and Calgary, Alberta.

OUR OPPORTUNITIES

We offer the opportunity for advancement and professional growth in a challenging and stimulating environment. Appointment level and salary will be dependent upon experience. Benefits include contributory pension, life insurance and medical/dental plans.

Relocation assistance includes airfare to Alberta for successful candidates and their families together with various settling-in allowances.

An interview team will be in the U.K. in April. Please send curriculum vitae, by March 26, to:

Mr. C. Ireland,
Alberta Government Services,
Civil Service Mobility Offices,
Government of Alberta,
2nd Floor,
22/23 Old Burlington Street,
London W1K 1BL

(4708)



THORBAR

A DIVISION OF INBUCON MANAGEMENT CONSULTANTS LIMITED

SENIOR ANALYST LAGOS - NIGERIA C.24K NIARA (C. £20K)

PLUS: FREE FURNISHED ACCOMMODATION, CAR, MEDICAL CARE INSURANCE AND PAID AIR FARES

Our client is a well-established company with branches throughout the Federation of Nigeria and has interests in such areas as breweries, textiles, electrical and property development finance. In Lagos DP facilities are provided by an IBM mainframe and operational systems embrace a wide range of commercial and accounting applications.

A SENIOR ANALYST is required with several years' sound experience including some programming, ideally in wholesaling or retailing, who is competent to control projects. An IBM/DOS background is preferred. Applications are invited from single or married persons for an initial tour of 12 months (renewable).

For further information contact JACK COLLINGS on 0273 833848 (during office hours) or on 0273 400880 any evening after 6 p.m. (including weekends).

INBUCON MANAGEMENT CONSULTANTS LIMITED

D.P. Appointments & Contract Personnel
Greenock House, 19 Cuckfield Road, Hursley, Hants.
Surrey BN6 9RP Telephone: Hursley 01273 833848

(4796)

INBUCON

Systems Programmers

to £13,700

HERTS

Our clients are a company whose commitment to DP is total. They have embarked, in this time of recession and economic uncertainty, on exciting and challenging new development including the latest state of the art hardware and software methodology.

Additional members for a fast-developing team, with a capacity for unique technical education, effective in a pressure environment and wishing real career advancement are required with two years' IBM orientation and any of the following experience:

- ★ Real-time Systems
- ★ VTAM/SNA Appreciation
- ★ Planning & Admin Procedures
- ★ Support for IBM 8100 Distribution Environment

Please contact TONY HATHERALL for further details.

Computer Search
01-404 0152

North House, 13 Southampton Place, London WC1A 2AU

JOIN THE MODERN BUREAU SCENE

PROJECT LEADER (Programming) neg. circa £8,000
To lead a small team of programmers and analysts in the design and development of DP Applications using IBM 6100 hardware and COBOL. Several years' experience of systems design and programming required.

ASSEMBLER PROGRAMMER neg. circa £8,000
Suitable applicants will have at least 2 years' IBM Assembler/COBOL programming experience, preferably in a DOS/VS/VS/VS environment. An interest in progression to systems programming would be useful.

CONTRACT PROGRAMMER & ANALYSTS
We have available a number of contracts for experienced personnel with any of the following skills:
★ IBM ASSEMBLER (Applications)
★ MARK IV
★ SYSTEMS ANALYSIS (Financial)
★ VTAM APPLICATIONS
★ CICS/COBOL/VSAM OR Database
Competitive rates and package are provided

For further details send c.v. or phone Jo Cade on 0742 730181, Southfield House, Brook Street, Sheffield, S1 2BU.
A MEMBER OF THE JOHNSON ROTH BROWN GROUP OF COMPANIES

ANALYST/PROGRAMMER

The company is a leading force in the construction industry in Ireland.

The company has a ICL 2803 on site and is near completion of Phase 1 of its computerisation plans. Phase II is in the planning stage.

The successful candidate who will be based in Dublin will be required to contribute to the problem and system definition and will be in technical areas. He or she will have 3 years' COBOL programming experience plus system and program design experience. ICL 2803 experience is desirable.

The company will offer a salary commensurate with the importance of the position.

Please send a detailed resume of your experience to:

The Personnel Manager
P. J. WALLS (DUBLIN) LIMITED
Glandore Road, Dublin 8

ALSY'S ADA LANGUAGE SYSTEMS

A French company recently founded by Jean Ichbiah, principal designer of the Ada language requires a:

PROGRAMMING LANGUAGE SPECIALIST

who will be involved in Ada related activities such as:

- standardisation of the language
- relations with implementers
- formal definition
- training (seminars, computer-aided, training project)

based in Paris area.

Send application letter and resume to:
René BERETZ, ALSYS, 45 rue CARNOT
78000 VERSAILLES, FRANCE

SYSTEMS ANALYST c.£8,500

One of the country's most progressive publishers currently have an excellent career opportunity for a young Systems Analyst to join their small but developing Computer Department. Whilst currently operating on a bureau system, an IBM 4331 is to be installed shortly.

Ideally you will have had an IBM Cobol programming background and one to two year's Systems Analysis experience in a commercial environment. Experience of VM/CMS and/or VSAM would be an advantage.

In addition to salary, benefits include non-contributory pension scheme, life assurance, permanent health insurance BUPA, Luncheon Vouchers and Season Ticket Loan schemes.

Applications should be made in writing to Ken Hersey.

Mills & Boon

15-16 Brook's Mews, London W1.
Telephone: 01-493 8131

THE COMPANY

Turnkey Systems House specialising in MINI-COMPUTERS to first-time users. Rapidly becoming a Market Leader in this fast-growing market.

TOP SYSTEMS ANALYSTS/DESIGNERS

£10-£12K
With solid experience in Financial/Accounting Applications including Order Processing and Stock Control. To design Interactive Systems based on high powered Mini-Computers.
Requires fluency and authority when dealing with a wide range of first-time users.

Extensive Accounting Systems experience is essential. Therefore, you must have done the job before. Great possibility for a DPM yearning to return to a "Doing Job".
Contact: Jack Schumann, Director.

STAR COMPUTER GROUP
64 Great Eastern Street, LONDON EC2A 3QR
Tel: 01-739 7633

Overseas via I.A.

SOUTH OF FRANCE

SYSTEMS PROGRAMMER

urgently required by our client to provide on-going support and to develop new systems. Hardware here is an IBM 4341 running under DOS/VSE and CICS/VS. Knowledge of French useful, but not essential.

ANALYST PROGRAMMER

required to join the above. Installation on a permanent staff basis; good COBOL and CICS programming knowledge will be looked for. For this position fluent French is essential.

PLEASE WRITE OR TELEPHONE NOW

Ann Arledge
Marketing and Recruitment Director
Industrial Action Limited
21 Grosvenor, Finsbury Park, N1 2BP
Tel: (0432) 571411 (Day) or (0432) 700700 (Evening)

I.A. is a Registered Employment Business licensed by D.M.E.

SMR
Sales & Marketing Recruiters Ltd
100 Victoria Road, 25 Regent Street, London W1R 3JH
01-734 9776

SALES EXECUTIVES

Just in case you think we are merely the industry's leading supplier of career guidance for salesmen (to say nothing of sales training and market research), we are currently recruiting candidates for over 100 selling jobs within more than 30 computer companies.

If you are seeking a career rather than just a selling job, contact Alasdair Scott or Alan Williams - we have the experience to understand your needs.

SALES PROFESSIONALS

VERY HIGH BASIC - 2-LITRE CAR EXCELLENT COMMISSION (UNLIMITED) OTHER BENEFITS

Good prospects for early promotion

Our client will be interested in talking with you if you have a successful selling record and a working knowledge of one or more of the following:

- Commercial Applications
- Distributive Processing Systems
- Communications
- OEM Sales
- Key to Disc

In return you will be offered the opportunity to use your professional skills in an exciting environment with unlimited earning potential. In the first instance telephone Camberley (0278) 32888 (office hours) or Farnborough (0251) 616878 to 10 p.m.

CCAB COMPUTER CONSUMER ADVICE BUREAU LTD.
Computer and Recruitment Consultants
6 Green Lane, Blackwater
Near Camberley, Surrey

FIELD SUPPORT/SERVICE

TECHNICAL SUPPORT - NEW LAUNCH - £14000 + 2-LTR. CAR + TRAVEL U.S.A.

One of the great American innovators in the computer industry are launching a major new product range. Support positions are open to engineers with IBM experience seeking real challenge and management opportunities.

FIELD SYSTEMS ENGINEERS - LONDON/HOME COUNTIES
START £9000 + O/T + S/B + CAR + BUPA
High growth mini manufacturer - two new branch offices within last six months - seeks promptable young engineers - train U.S. and Europe - next more technical support

FIELD SERVICE - READING, N. & W. LONDON
START £7200 + O/T + CAR + TRAINING
British mini manufacturer is offering opportunities for career development to field service engineers. Full product training on state of the art minis, dynamic management team and early promotion are some of the benefits of working for this friendly company. Call Keith Wallis to arrange early interviews with any of the above on: 01-643 4846 (6 lines)

ALL TRONICS PEOPLE (AGV)

SALES BIT Knocking the competition

ONE of the basic rules of selling is: "Never knock the competition". This is an excellent sales discipline, but subject to misinterpretation.

Clearly, slandering rivals is not only discourteous, but, in many respects, it is a self-defeating exercise. It is unlikely to gain the admiration of the potential buyer. In other words, it's a good method of destroying personal credibility.

On the other hand, an essential responsibility of all salespeople is to gain fluency in the specification and capability of competitive products so that they have real understanding of the strengths and weaknesses of their opponents as well as their own.

To declare truthful and undeniable product-related facts is by no means deformation of a competitor's character, or professional credibility. Salespeople should not allow the "don't knock the competition" syndrome to inhibit them from highlighting their sales advantages by exposing the weaknesses of competitive products in an accurate and ethical manner.

This demands absolute discretion and sensitivity, for there is sometimes a very thin line between constructive and destructive truth.

Any reasonable code of behaviour will forbid abuse of the reputation or character of a competitor whether attack be full-frontal or merely innuendo comments such as "You can't rely on the XYZ company"; "the XYZ company don't understand the business"; "the XYZ company made a complete mess of the job". If the XYZ company is going down the tubes, "the XYZ product is a load of rubbish".

These are all completely unacceptable, whether they be true or not. They are sure attempts to enhance one's status artificially by virtue of the relative failure of others, and it usually has the effect opposite to the one desired. Even the establishment of total or relative shortcomings in competitive products needs to be handled in a sensitive manner. Merely to state that "the self-start mechanism on the XYZ power unit is unreliable" is to appear jaundiced and snide. More to the point, the comment can be self-destructive if the potential buyer subsequently reveals he has no need for the feature in question.

One of the best methods a salesperson can use to highlight the shortcomings of competitive products is firstly to establish the product features required by the potential buyer. This list can be augmented by unique benefits of the salesperson's own product that the buyer accepts as desirable. It is then a simple process to use this information for creating a matrix of feature/performance in respect of the main competitors, thus indicating their relative shortcomings without direct reference by the salesperson.

One often sees this form of analysis in Press advertising related to motor cars: "Who else provides you with an electric ashtray at no extra charge?"

There is nothing wrong with establishing that the potential buyer will not only derive significant benefit from a particular product feature, while at the same time highlighting that competitors in general, or one in particular, are either unable to supply a similar capability or match its performance.

While the quality and speed of the ABC photocopier is similar to ours, the average cost per copy is a penny more and it does not have an auto-stacking feature." This kind of "attack" on competition is not only acceptable, but also essential in most circumstances. The salesperson can never rely on the prospective buyer having a complete dossier of information on all potential suppliers.

Another method of highlighting apparent weaknesses in competitive products is to establish the benefits of a unique feature of one's own product so firmly that it becomes a positive "want" unavailable elsewhere. This kind of opportunity does not occur very often, but needs to be exploited when it does. "The replacement of the traditional electro-mechanical servo by microprocessor control will provide you with increased reliability and reduced costs which were hitherto unavailable. Competitive products without this new facility could cost you in terms of uncovered savings."

If that is "knocking the competition" - keep at it!
Alan Williams

COURSES

MA VACATION school for people thinking of starting a business of their own, a series of weekend courses has been designed by the London Enterprise Institution of Electrical Engineers. It will be held from 30 March to April 3 at the University of Manchester Institute of Science and Technology. The idea is to allow students to become acquainted with some of the more advanced concepts applicable to the design of micro systems. Themes of the course are: The life cycle of a typical microprocessor-based product; contemporary software issues; microprocessor counts, marketing, and drawing up and making presentations to bankers. The cost of four weekends is £250, with a £150 rebate for Londoners. Details from The Christina Dagnall, IEE, Savoy Place, London WC2R 0BL. Tel: 01-240 1871 ext. BC4N 5AB. Tel: 01-236 280.

ComputerWeekly CLASSIFIED

DIRECT LINE 01-661 0121

the newspaper computer people rely on

PUZZLE ANSWER

SEVEN = 85457, THREE = 10355, ONE = 675 and THIRTY = 109312.

GUIDE TO RECRUITMENT CONSULTANTS IN THE U.K.

LONDON & H. COUNTIES (LH), MIDLANDS (M), NORTH (N), SCOTLAND (S), OVERSEAS (O)

NORTHERN IRELAND

ALL COMPUTER STAFF NEEDS

ESCO Management Consultants Ltd.
Professional, reliable, confidential.
Write to: 77 Botolph Claydon, Suffolk
077 131, or phone 01223 40088

Computer Professional Recruitment Consultancy
"COMPUTER PROFESSIONALS - MAKE SURE WE HAVE YOU IN MIND"
Head Office
01-274 0141
London Division 540

Ivor Norton Management Services Ltd.
Recruitment Consulting Division
82 Shaftesbury Avenue, London W1P 0JL
01-734 8802 (24 hour answering service)
P.O. Box 63, Copthall Tower House, Harrogate HG1 1TB. Tel: Harrogate 04328

TEMPORARY AND PERMANENT COMPUTER STAFF NEEDS
KIRK GARDNER
01-261 1241
London Division 540

ALL COMPUTER STAFF NEEDS
ESCO MANAGEMENT CONSULTANTS LIMITED
77 Botolph Claydon, Suffolk
077 131, or phone 01223 40088
Professional, reliable, confidential

FOR THE BEST PERMANENT AND TEMPORARY JOBS IN THE NORTH OF ENGLAND
NORTH EAST
01-261 1241
London Division 540

COMPUTER INDUSTRY SPECIALISTS
SALES • SYSTEMS • MARKETING • ENGINEERING • PROGRAMMING
INSIGHT MARKETING & PERSONNEL CONSULTANTS LTD.
AUSTIN HOUSE, CHARLOTTE STREET, MANCHESTER. TEL: 01-276 7825

SCOTLAND'S SPECIALISTS
COMPUTER STAFF APPOINTMENTS
Vacancies in U.K. and Overseas
Alec Daly
134 St. Vincent Street
Glasgow G2 3JL
041-221 4156

RECRUITMENT SPECIALISTS
OCC Computer Personnel
21 Housley Street, Norwich
Norfolk NR1 1JH
0692-627300